

THE IRON AGE

A Review of the Hardware, Iron, Machinery and Metals

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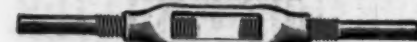
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Number of Shooters using U. M. C. Shells,	118
Number of Shooters using Shells made by six other Manufacturers,	93 211
Number of Shooters making straight scores,	8
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CAHALL BOILERS See Page 96

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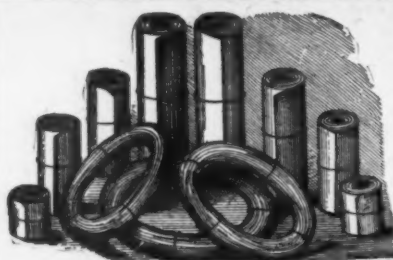
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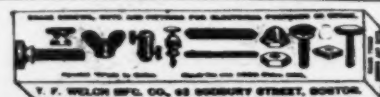
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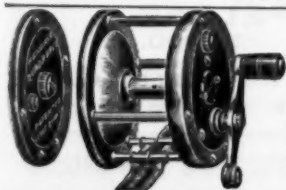
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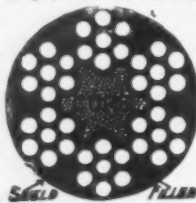
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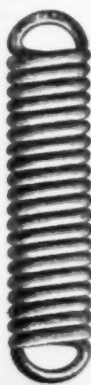
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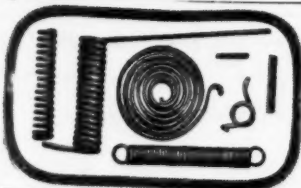
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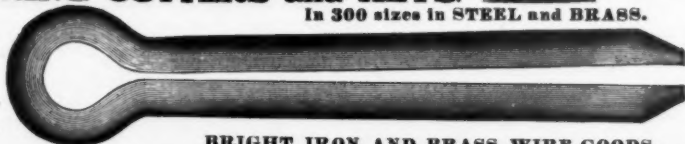
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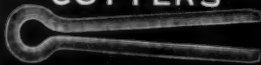
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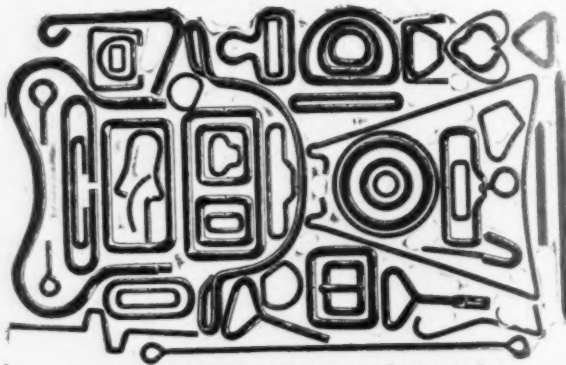
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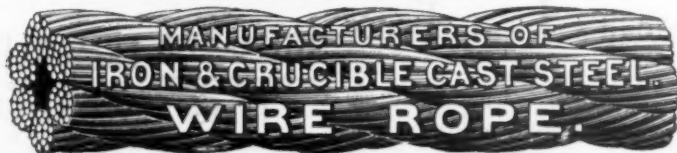
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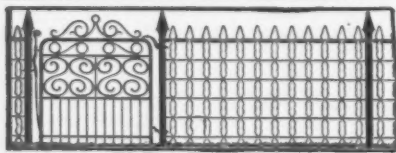
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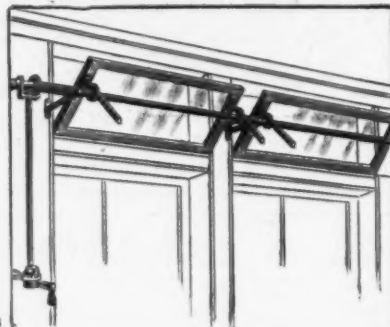
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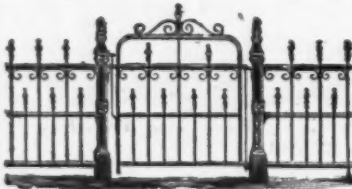
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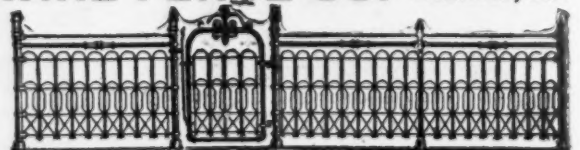
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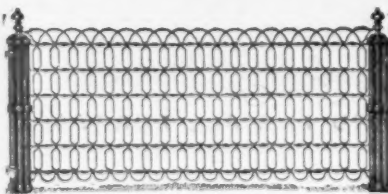
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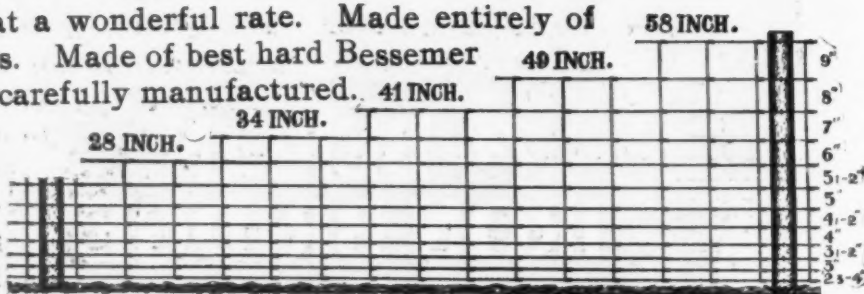
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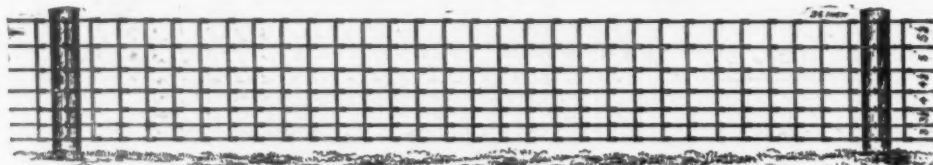
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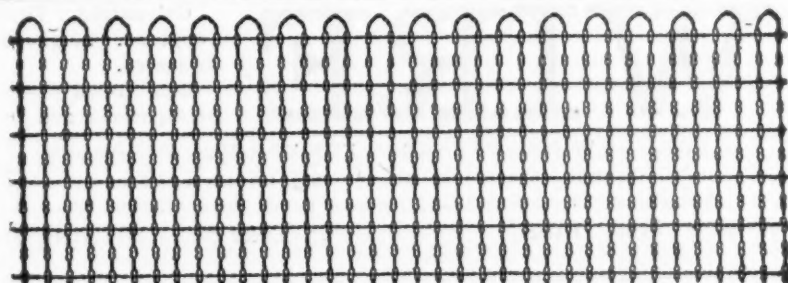
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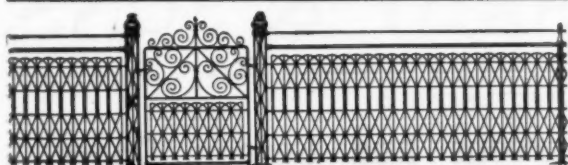
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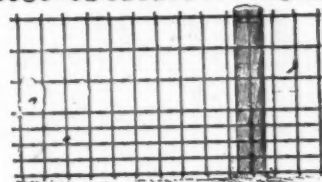
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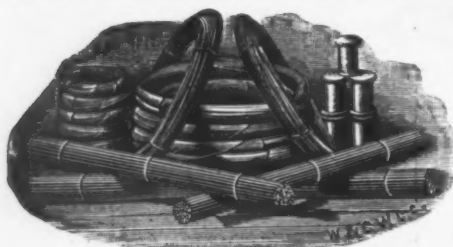
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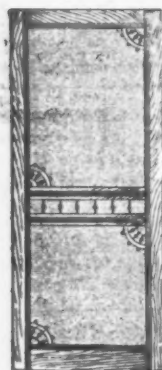
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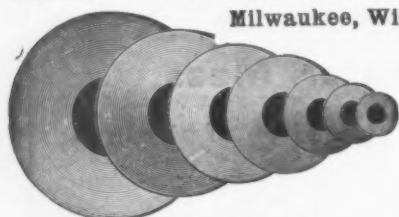
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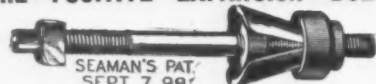
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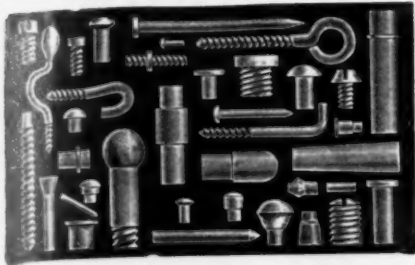
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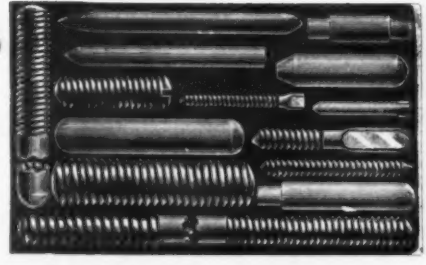
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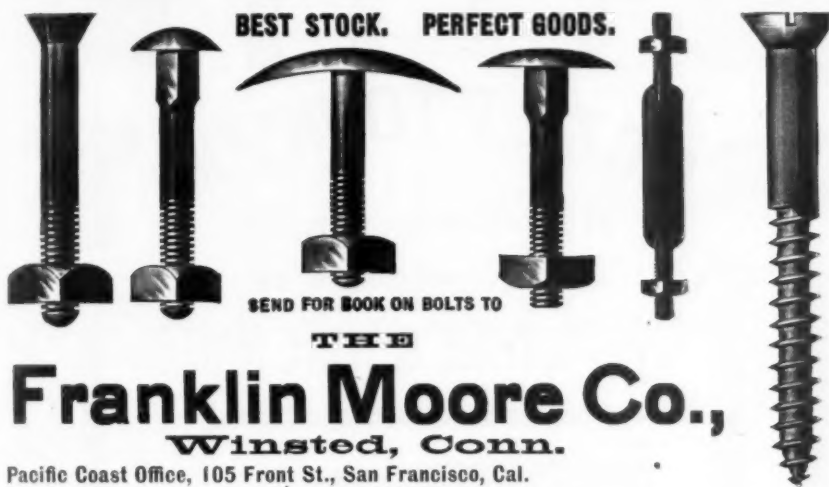
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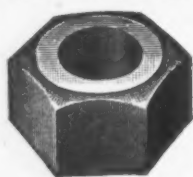
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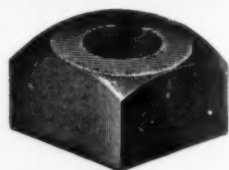
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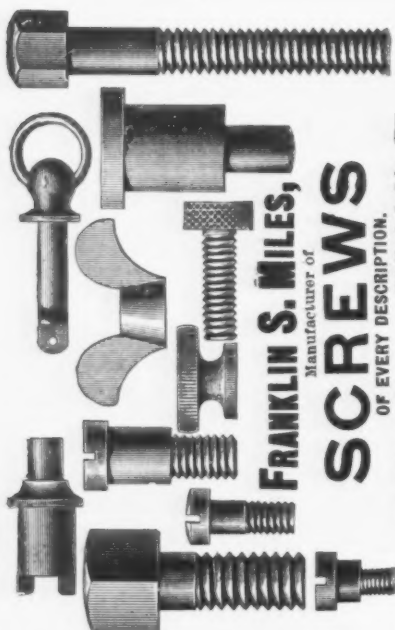
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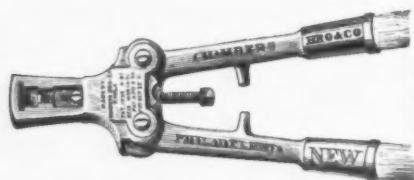
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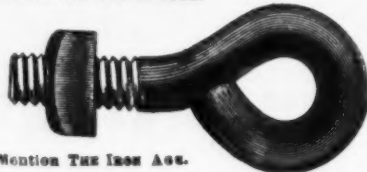
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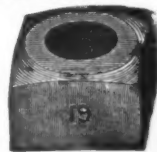
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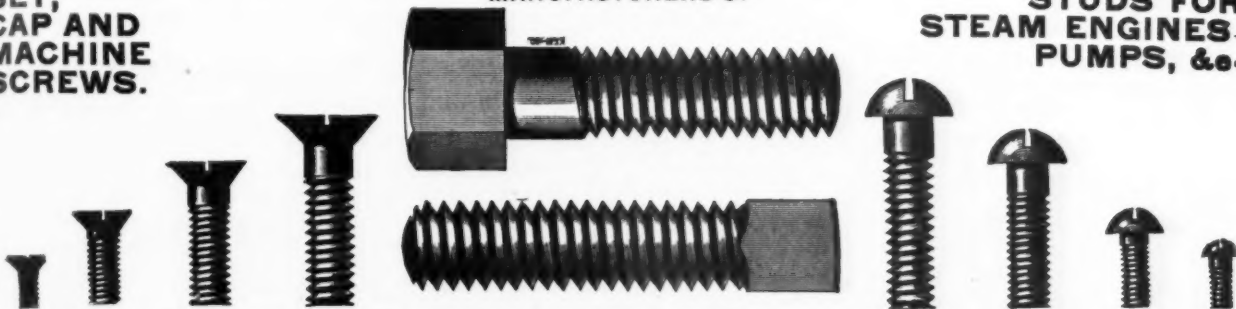
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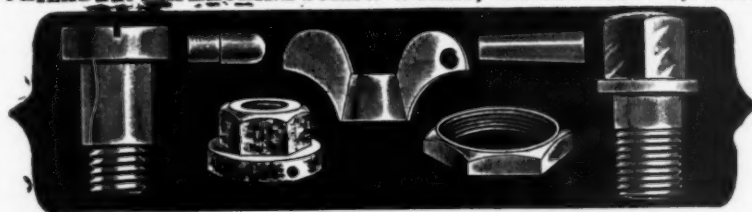
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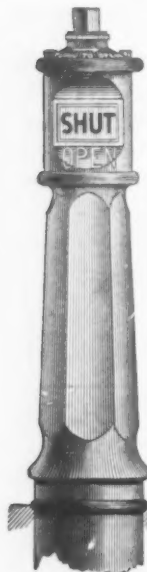
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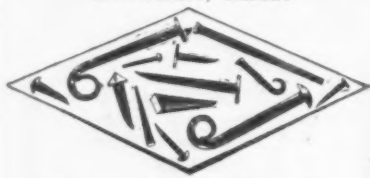
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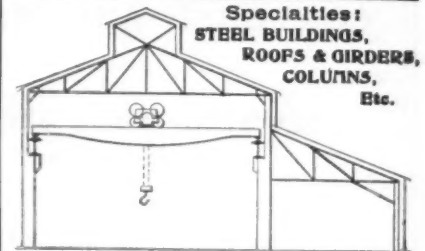
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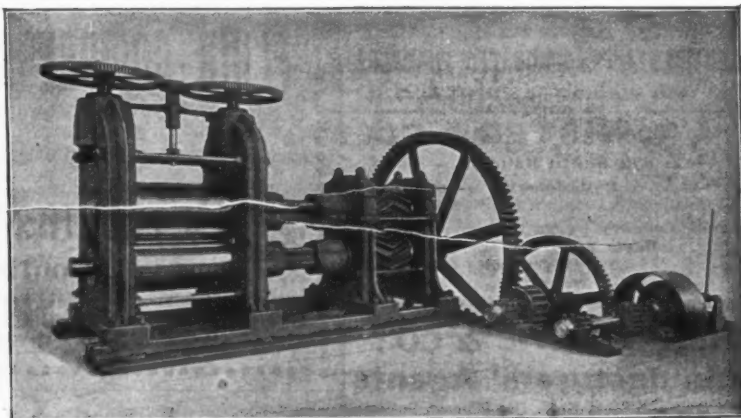
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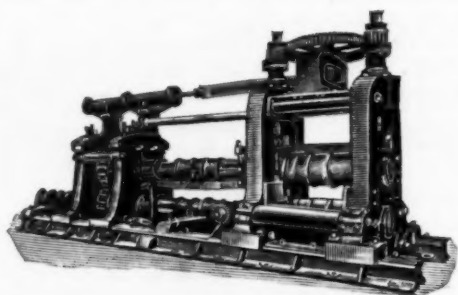
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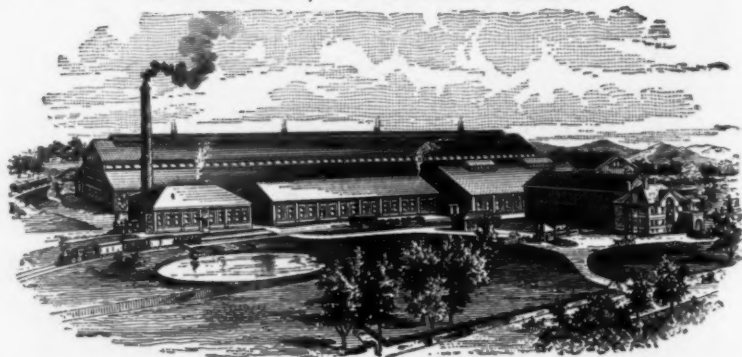
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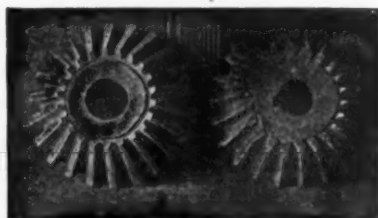
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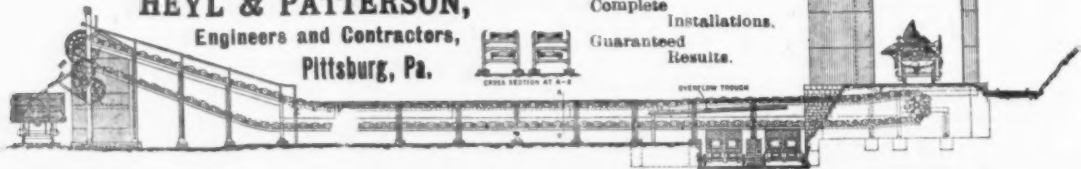
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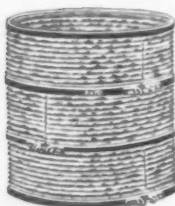
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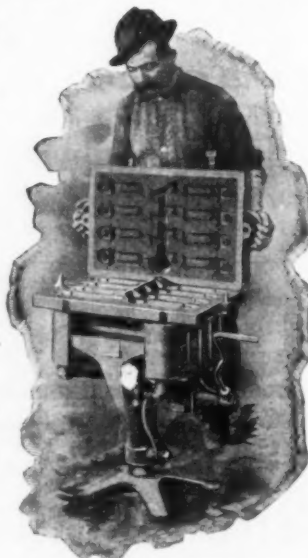
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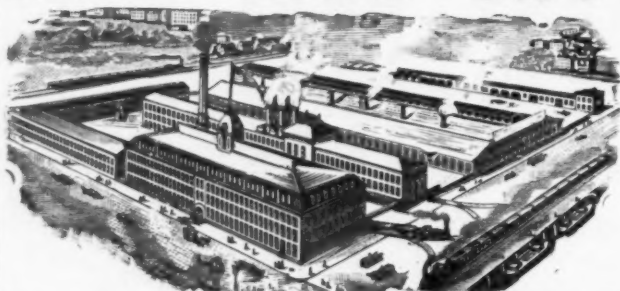
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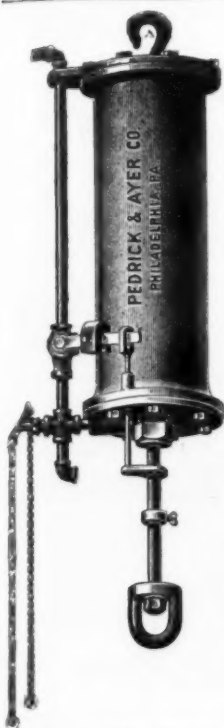
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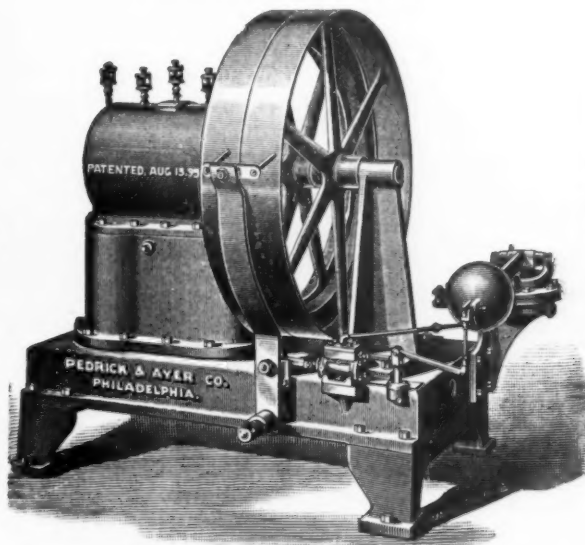
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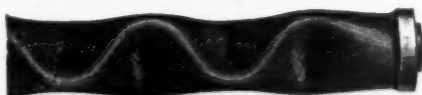
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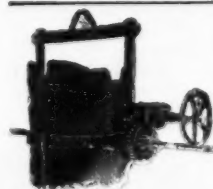
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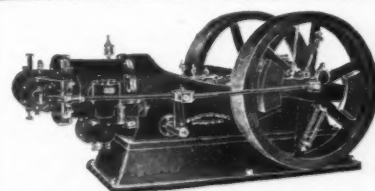
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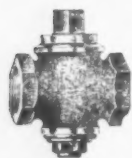
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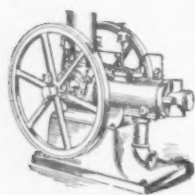
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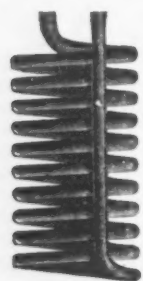
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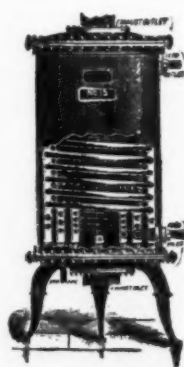
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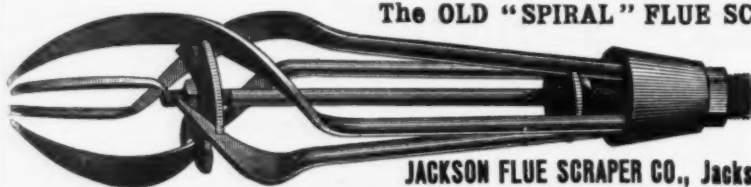
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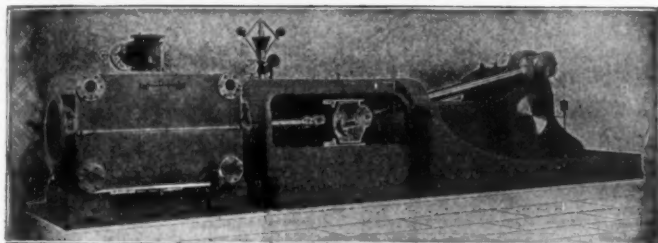
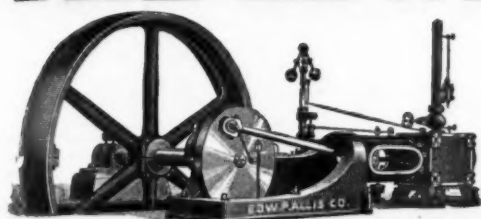
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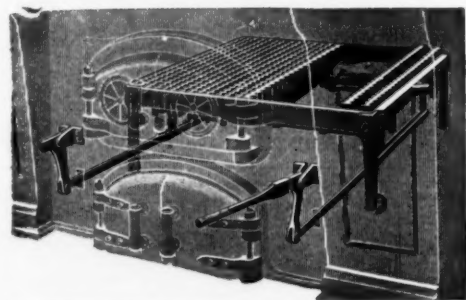
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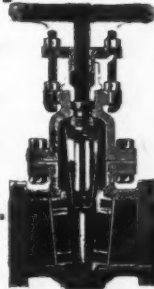
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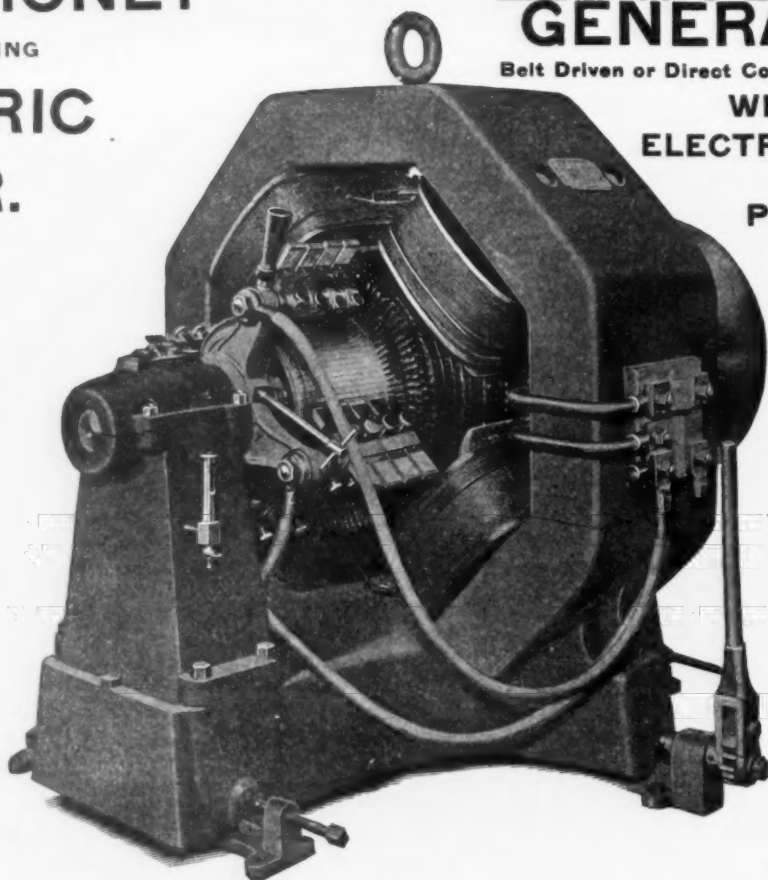
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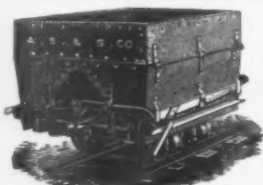
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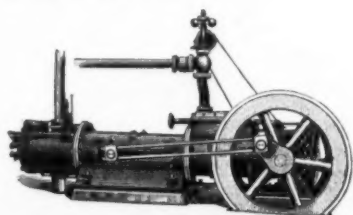
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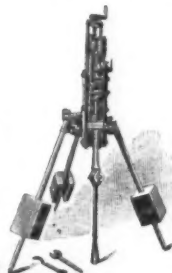
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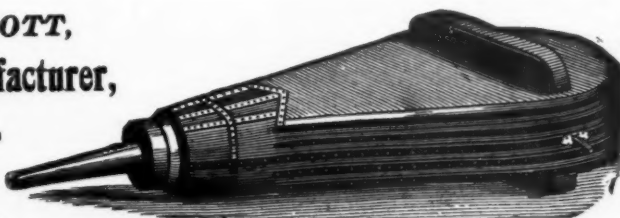
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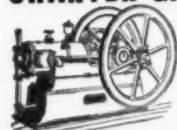


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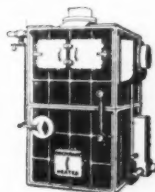


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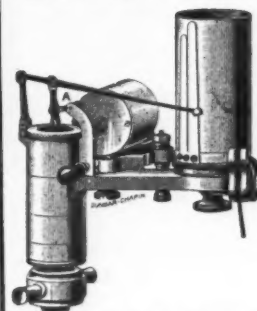
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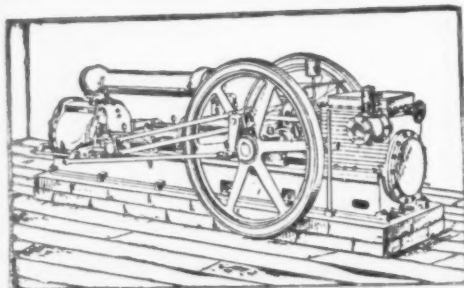


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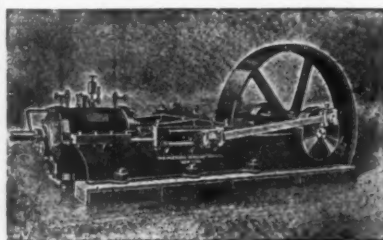
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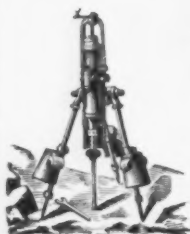
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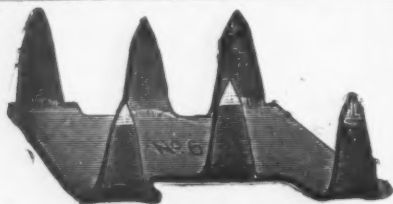
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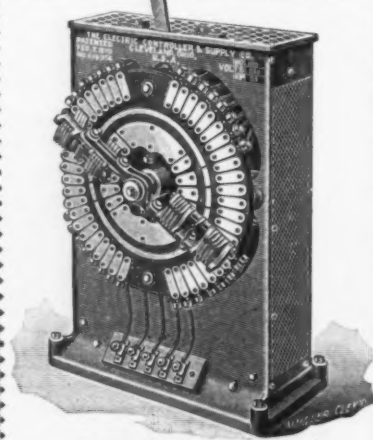
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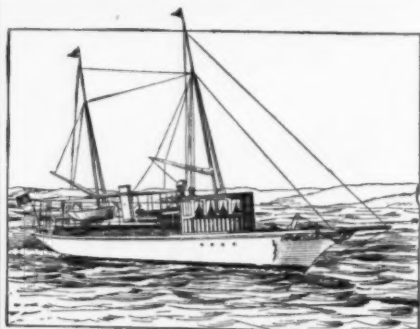
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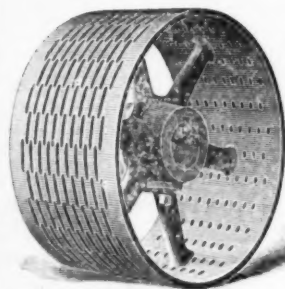
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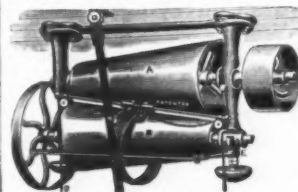
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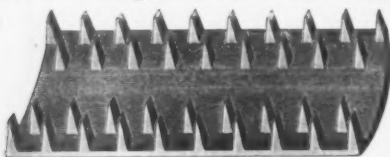
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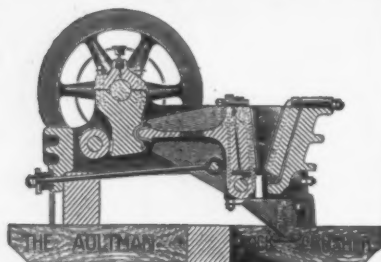


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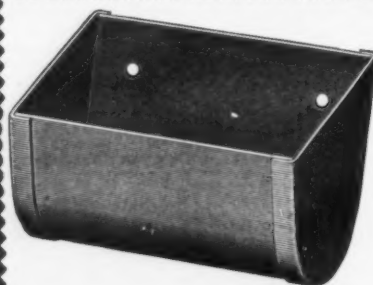
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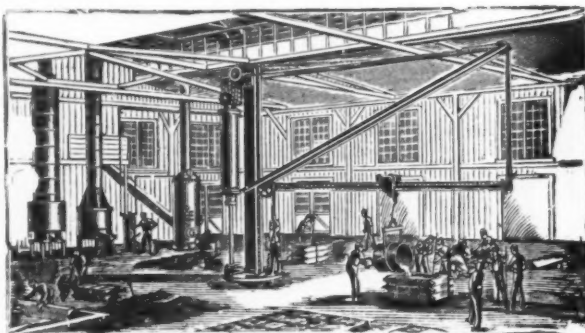
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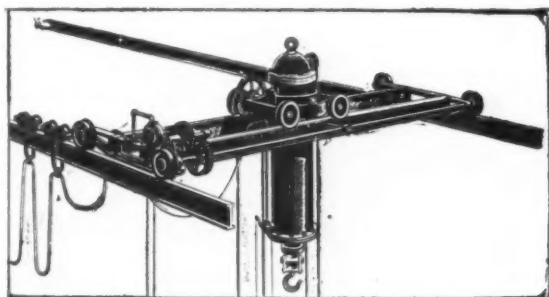
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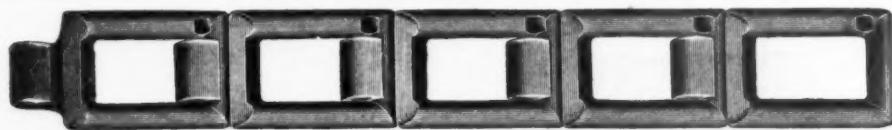
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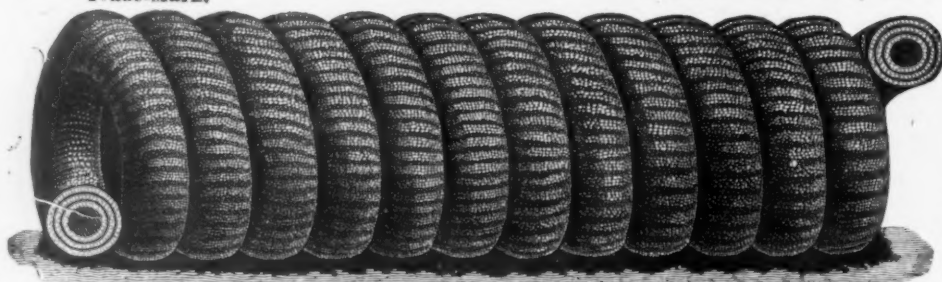
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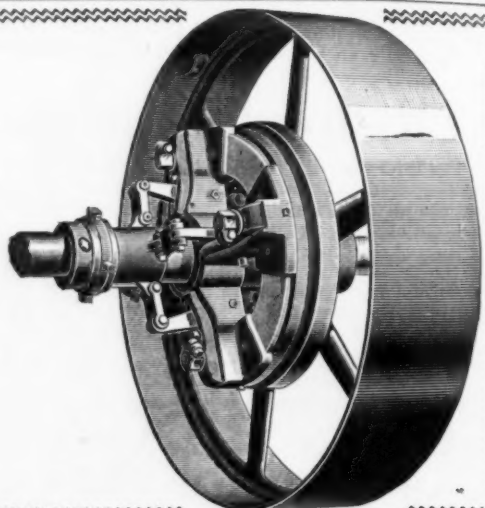
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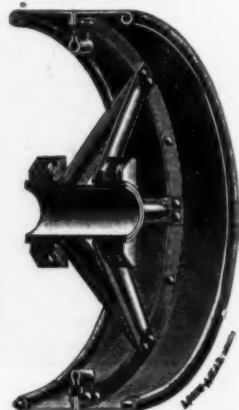
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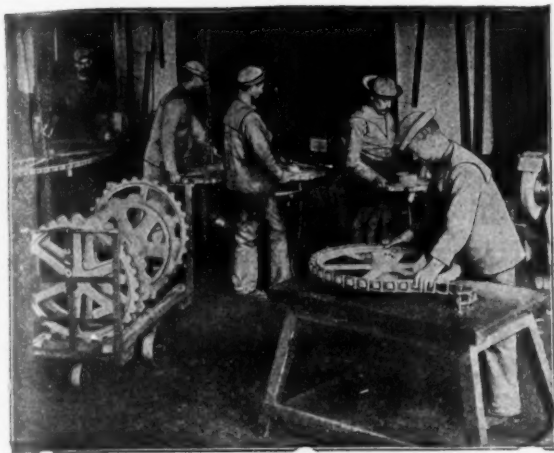
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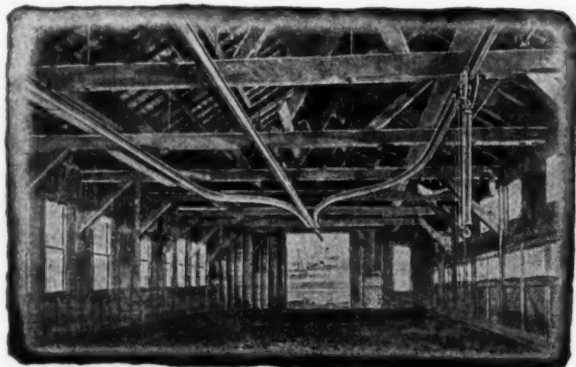
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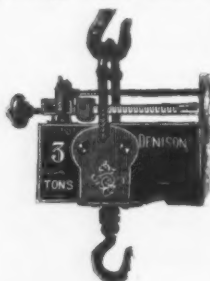
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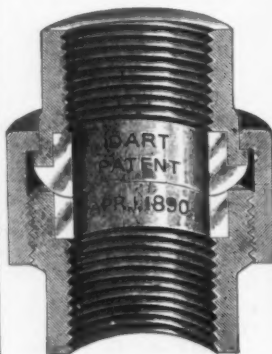
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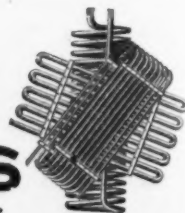
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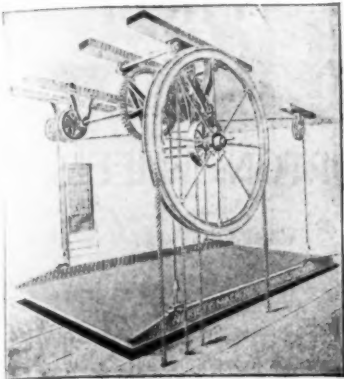
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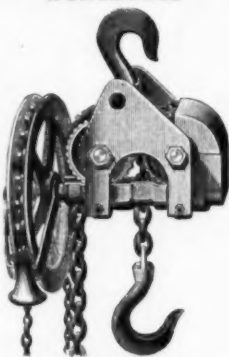
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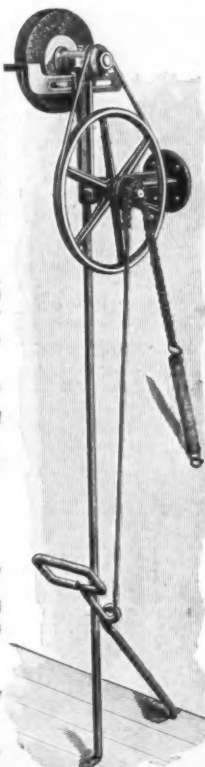
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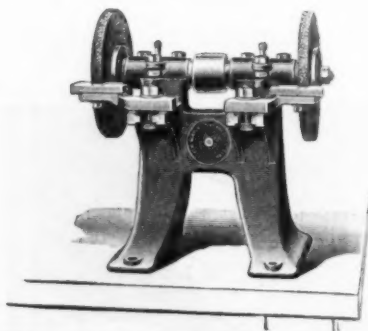
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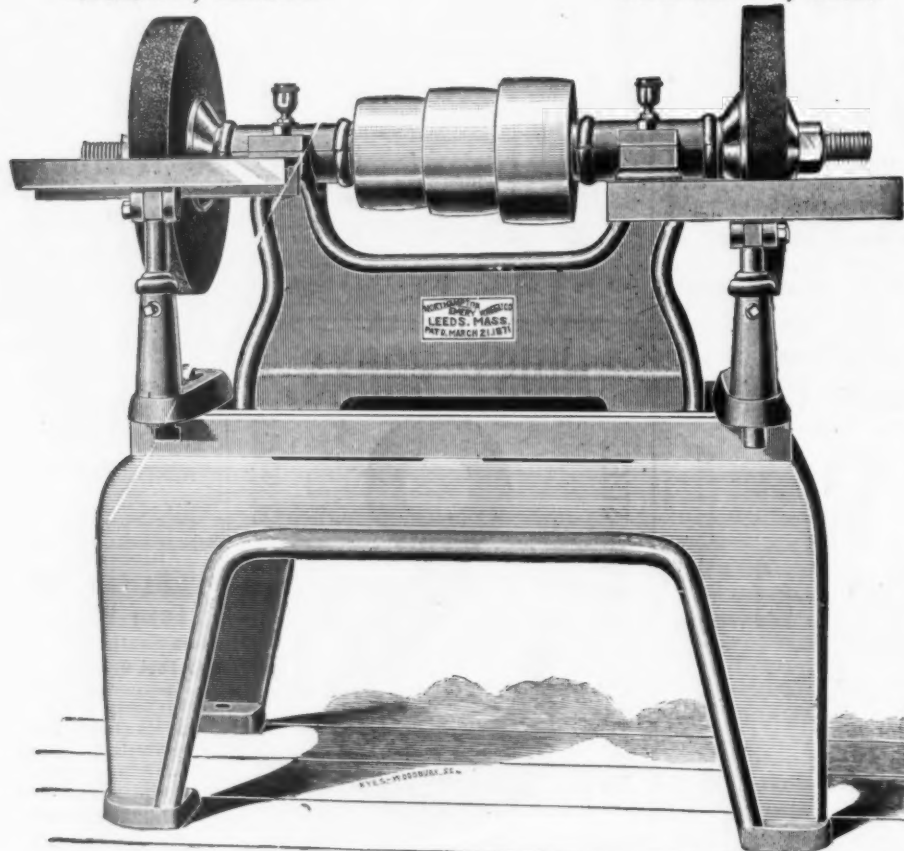
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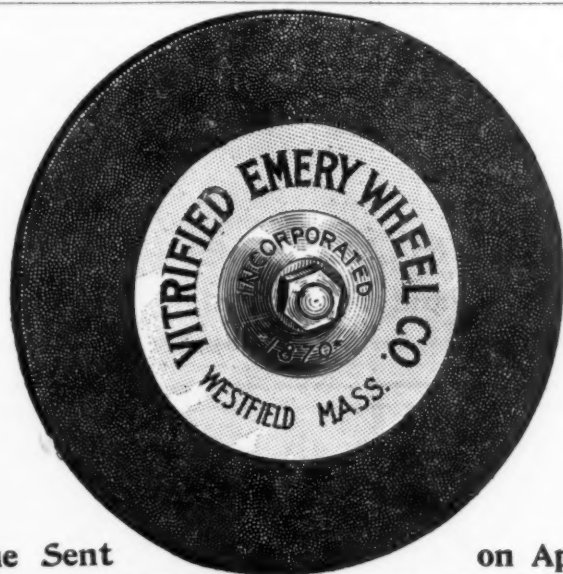
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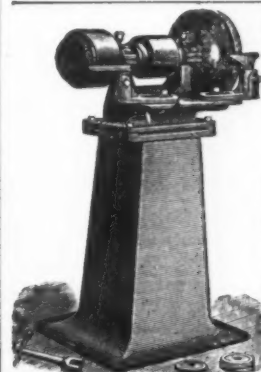
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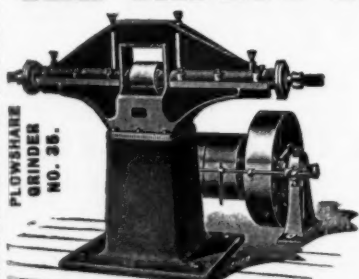
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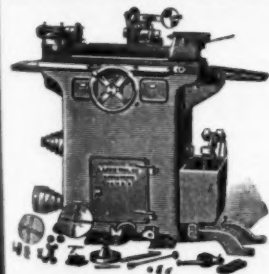
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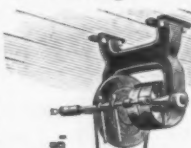
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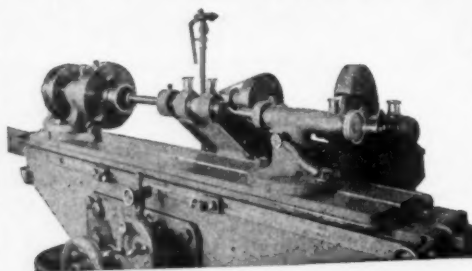
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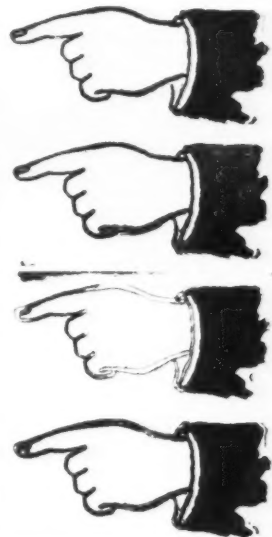
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If you want gage jaw machines we are replacing them every day with "New Yankees" and would be glad to dispose of those taken in exchange at any old price. You don't have to buy new ones if you want them.

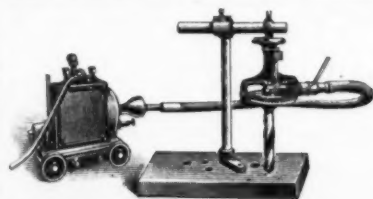


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is superior to any other by reason of its rapidity and general excellence.

This is made for producing bolts from $\frac{3}{4}$ in. up to $2\frac{1}{2}$ in. and is sold complete with all necessary attachments. If you want Bolt Cutters, Pointers, Headers, Nut Tappers, Nut Machines, Upsetting and Binding Machinery, Washer Machines, Wire Nail Machinery, Hand and Automatic Spike Machines, Car-Link and Pin Machinery, Complete Equipments a specialty, write

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Recent in Development. Successful in Operation.
Our Flexible Shafts driven by our Compressed Air Motor

Light in weight. Mounted on wheels. Easily moved.
Cheap in price. Efficient in operation.
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FREDERIC SCHOFF, Proprietor.

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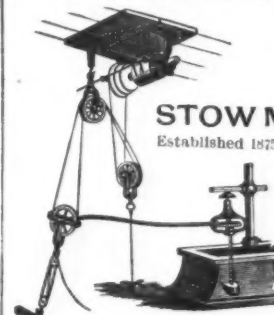
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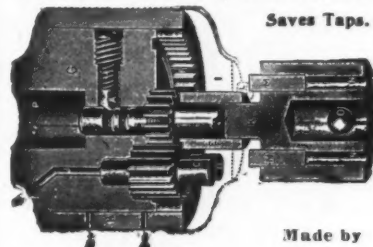
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THE IDEAL REVERSING TAP HOLDER.

Complete in Itself—Very Sensitive, and

Saves Taps.



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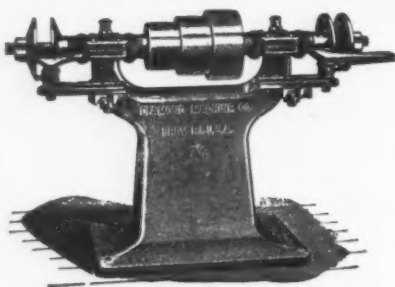
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This No. 7½ Grinder is built for heavy work. The distance between wheels is 48 in., diameter Spindle between flanges 1¾ in. or 2 in. as ordered. The Bearings are babbitted 12 in. long and have three high oilers in each. Weight of machine is 1200 lbs.

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Nobody ever heard of a Carborundum Wheel wearing smooth or gummy. The hard, brittle crystals break with use, just enough to keep the cutting edge always fresh and sharp.

That is why Carborundum Wheels do faster work, better work, and more of it than any other abrasive on earth.

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Largest Facilities.
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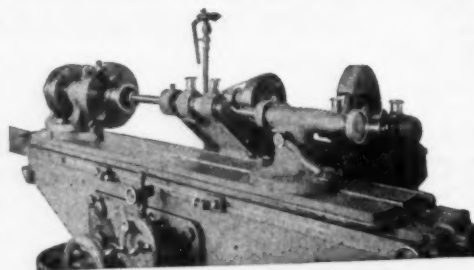
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Will make THE ENORMOUS SAVING OF OVER 50 PER CENT OF ALL THE TIME REQUIRED BY ANY OTHER DRILL GRINDER EVER PRODUCED, as the only preliminary adjustment necessary is to bring up the tail-stock to suit the length of the drill.

Every last gage jaw machine on the market requires not only the above adjustment, but cannot possibly grind a drill until they have first made all of the following additional adjustments or their full equivalents. Here they are:

Sliding sleeve is first loosened—Then moved away from wheel—The drill inserted—Gage jaws fitted to it—Sleeve clamped in that position—Drill removed—Drill holder loosened on bracket—Slid up to the wheel—Clamped in that position—And if by that time you have not forgotten where you are at, you are then ready to go on where we commence with our single adjustment of the tail-stock. Can there be any argument as to which machine you want?

IF SO

Then set our machine by the side of any or all others, and make the ACTUAL TEST. Compute the money lost in workmen's wages for the life of such a machine (say 25 years). The first cost of a "NEW YANKEE" will have been eaten up a dozen times.

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THE MOST SCIENTIFIC SHAPE to the point of the drill—therefore faster cutting and better work. Remember that we guarantee this feature.

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THE ONLY DRILL RAISER for manipulating small drills to be found in any machine on the market. (Worth its weight in gold.)

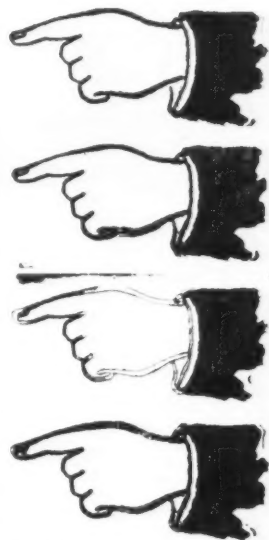
CHEAPER HELP can understand and operate it. DRILLS very much easier to hold to the machine, and will not rotate under the fingers when the wheel strikes them. ALL STYLES—ALL SIZES, BELT OR ELECTRICALLY DRIVEN.

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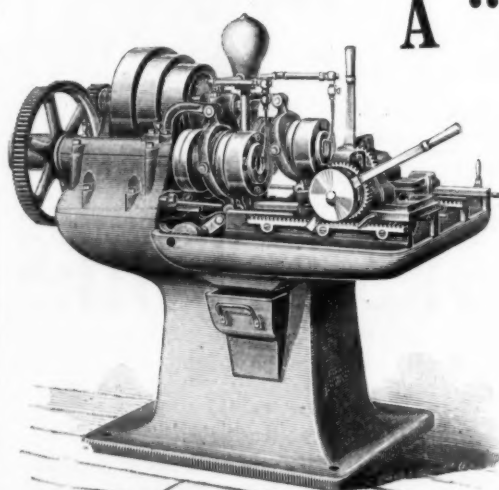
Successors to THE FULLER MFG. CO.

Pat. in U. S. and Foreign Countries.

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If you want gage jaw machines we are replacing them every day with "New Yankees" and would be glad to dispose of those taken in exchange at any old price. You don't have to buy new ones if you want them.

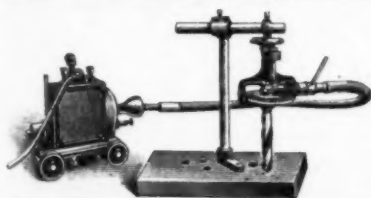


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is superior to any other by reason of its rapidity and general excellence.

This is made for producing bolts from $\frac{3}{4}$ in. up to $2\frac{1}{2}$ in. and is sold complete with all necessary attachments. If you want Bolt Cutters, Pointers, Headers, Nut Tappers, Nut Machines, Upsetting and Binding Machinery, Washer Machines, Wire Nail Machinery, Hand and Automatic Spike Machines, Car-Link and Pin Machinery, Complete Equipments a specialty, write

THE NATIONAL MACHINERY CO., - - Tiffin O., U. S. A.



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Light in weight. Mounted on wheels. Easily moved. Cheap in price. Efficient in operation.

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BOLT THREADERS HEADERS and NUT TAPPERS.

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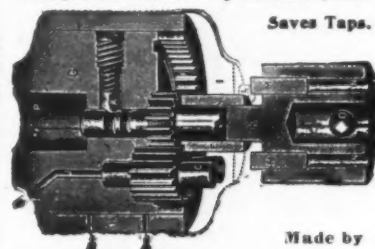
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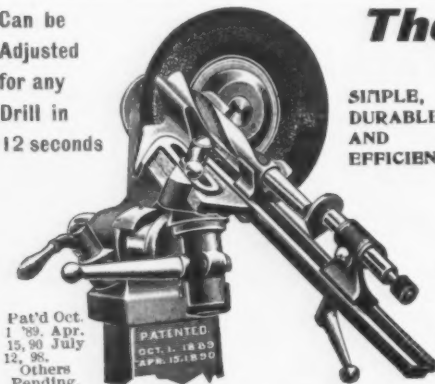
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Can be
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Drill in
12 seconds



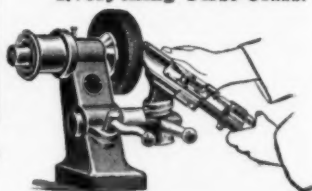
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can be used as ordinary bench tools with two handles, or as ratchet tools with one handle

Will cut right or left

One man can cut 2 inch pipe.



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Formed Cutter with Double Angle.



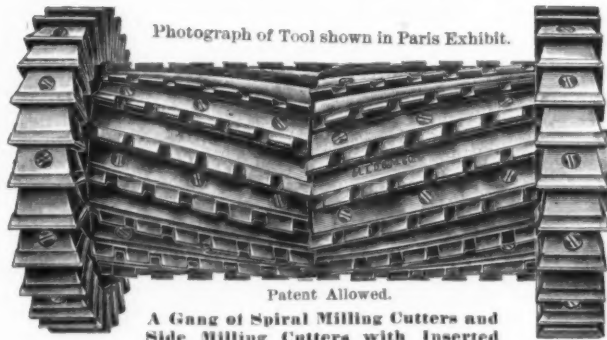
Cutter with Double Angle.



Angular Cutter with Side Ground Concave

Morse Twist Drill and Machine Co.,

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Photograph of Tool shown in Paris Exhibit.

Patent Allowed.

A Gang of Spiral Milling Cutters and Side Milling Cutters with Inserted Teeth.

Whole Length of Gang, 15 1/4 inches.
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Diameter of Spiral Milling Cutters, 6 inches.

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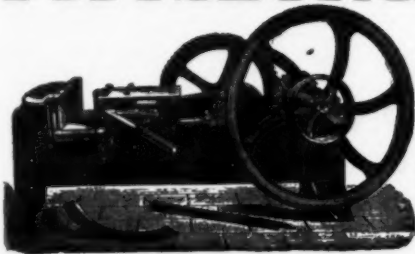
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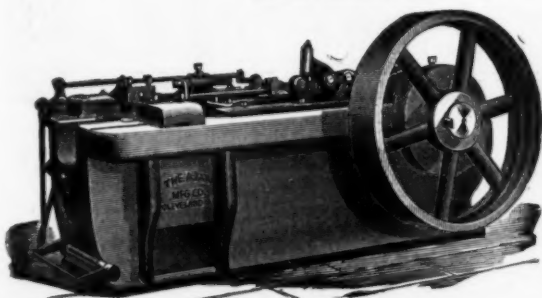


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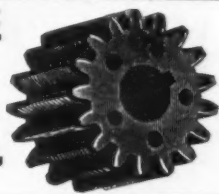
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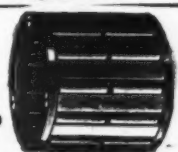
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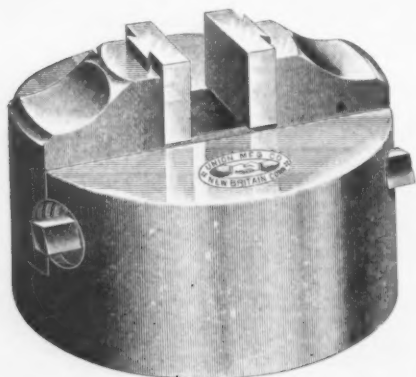
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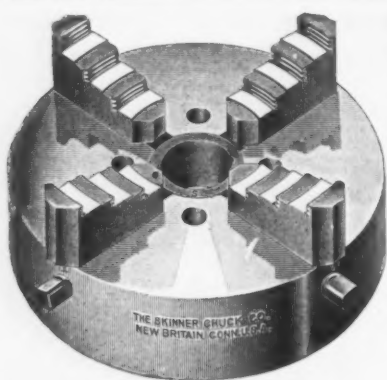
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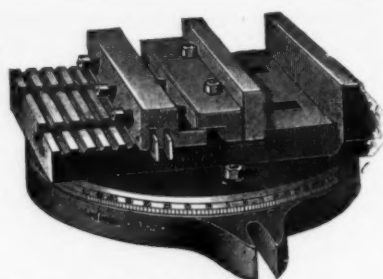
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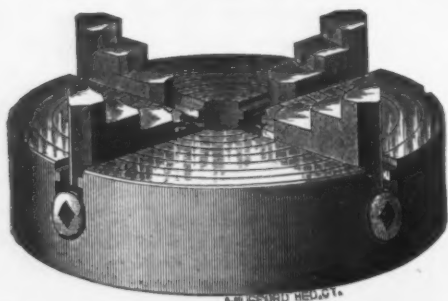


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PEERLESS AND DUPLEX
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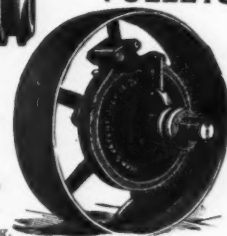
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PULLEYS



AND

CUT OFF COUPLINGS.

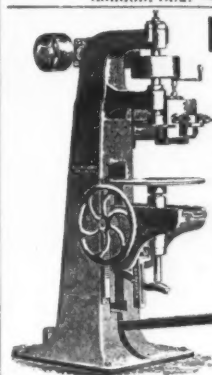
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for all purposes, of prac-
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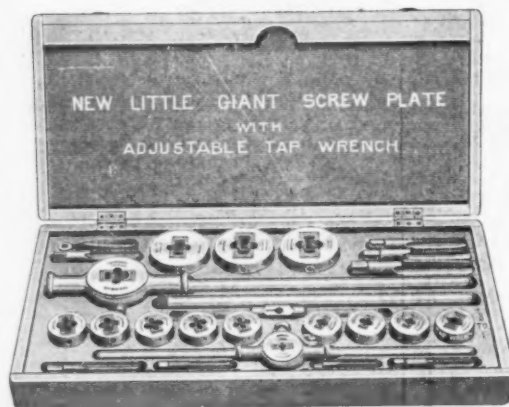
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For durability, convenience, beauty of design and finish, our Screw Plates are unsurpassed.

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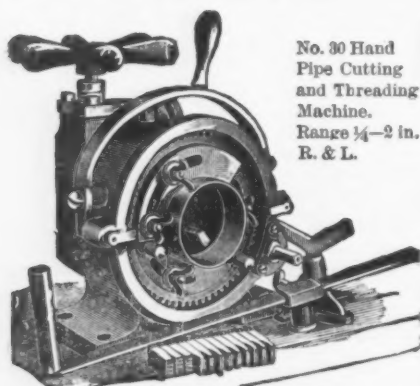
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If so, send for our Catalog “C,” for we will gladly send a copy free of cost, and in it you will find full description of them.

They make perfect threads at one cut.

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No. 15 Garden St., BRIDGEPORT, CONN.

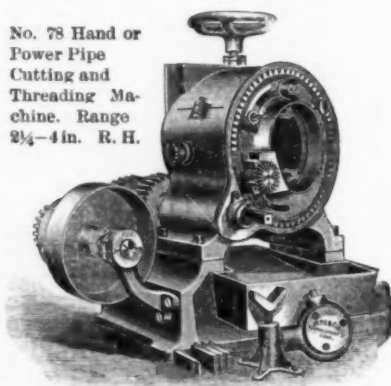
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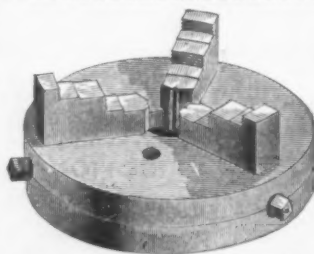
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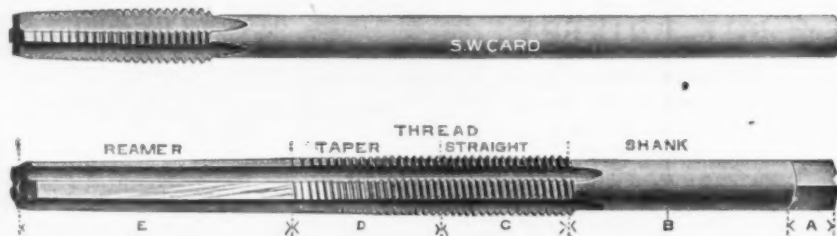
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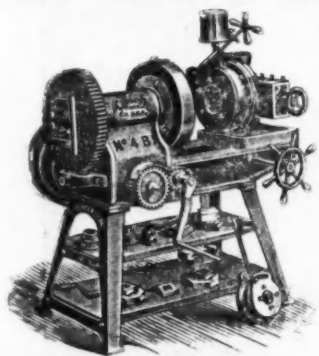
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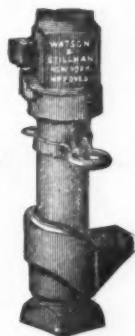
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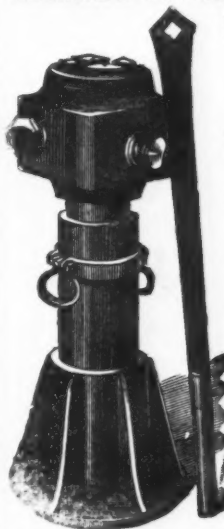
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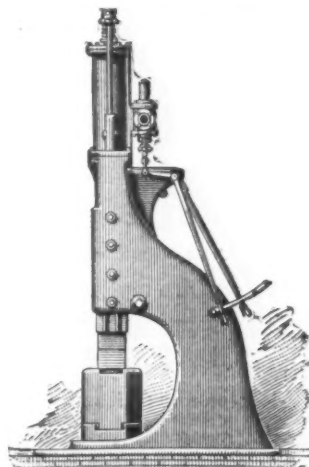
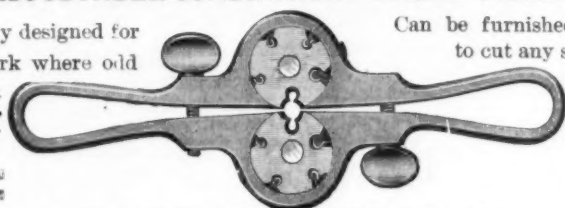
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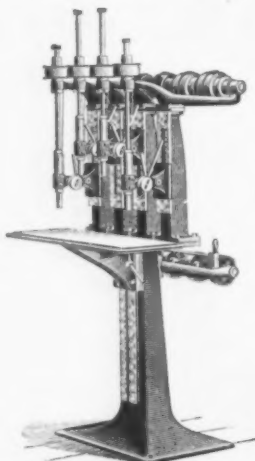
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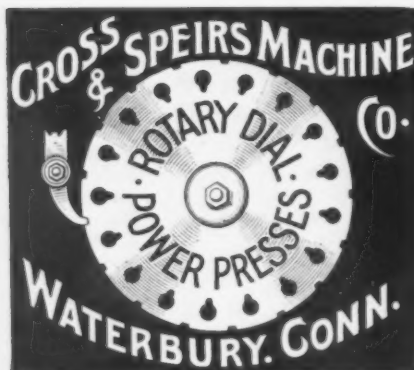
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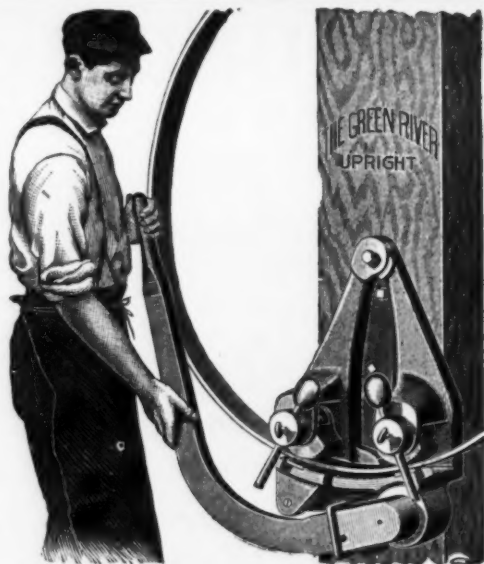
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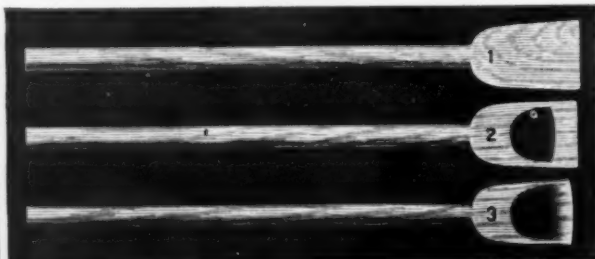
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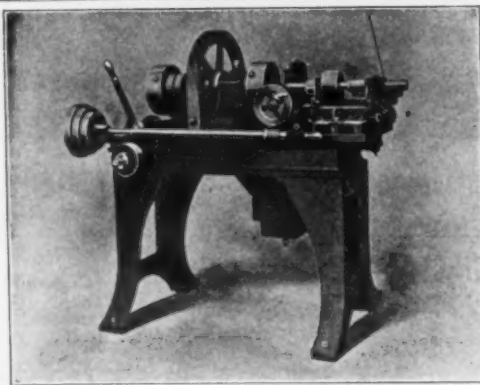
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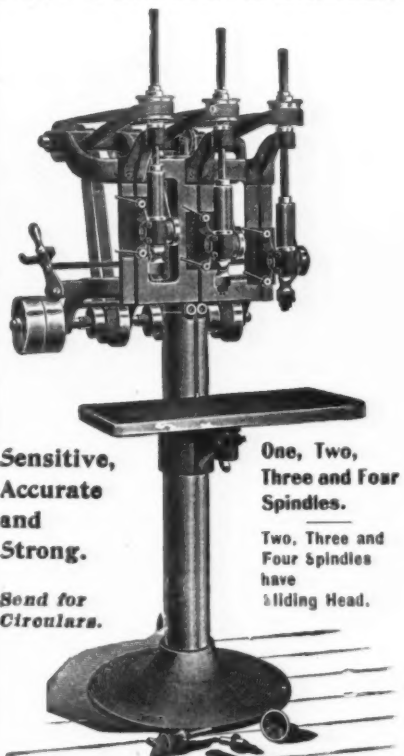
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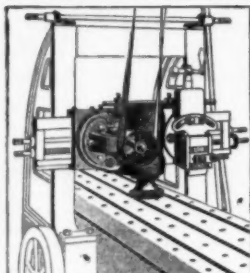
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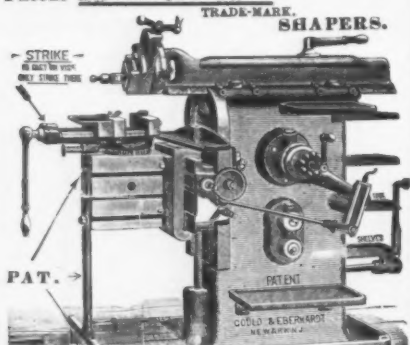


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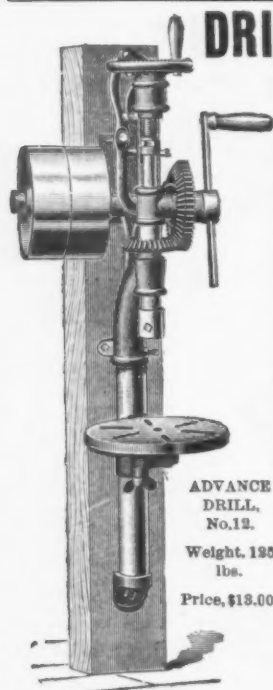
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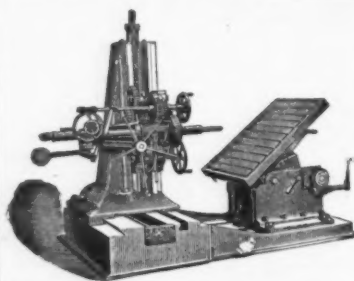
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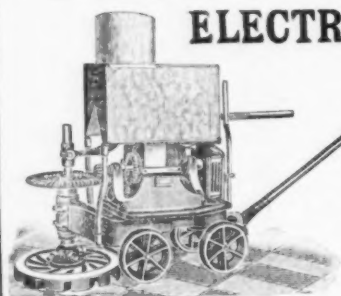
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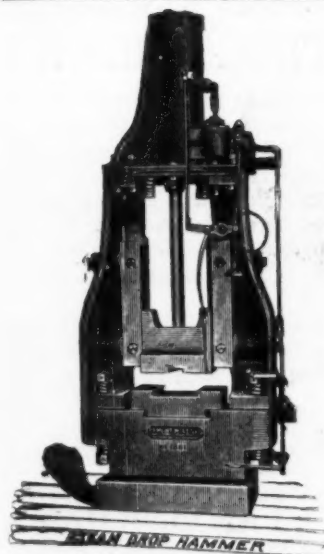
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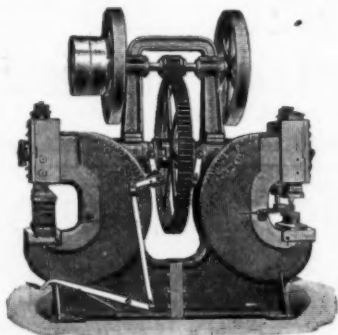
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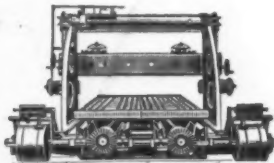
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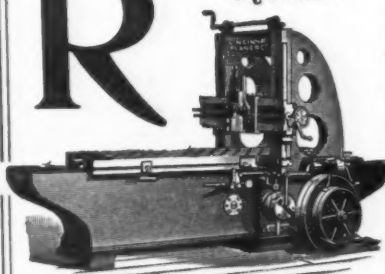
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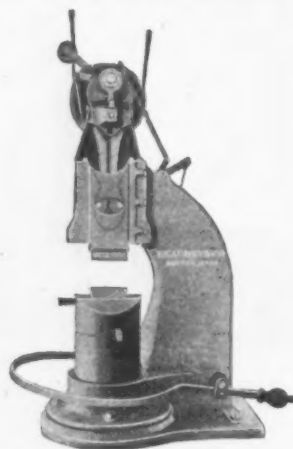
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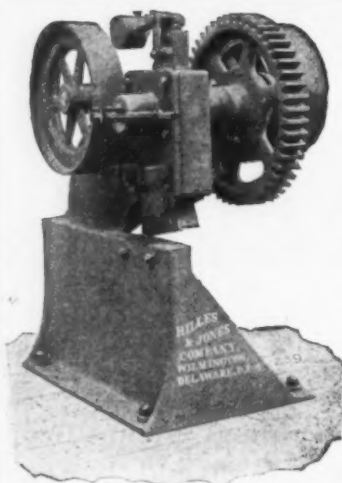
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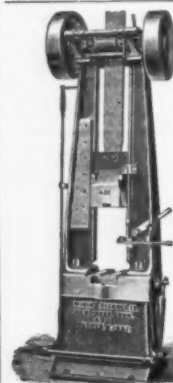


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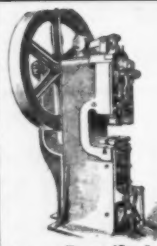
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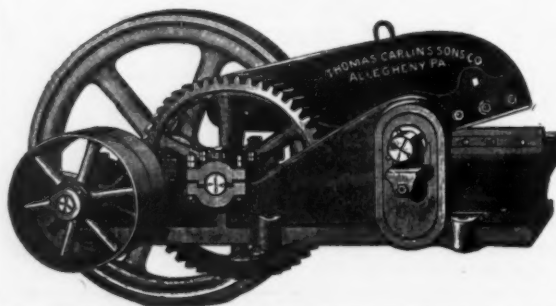
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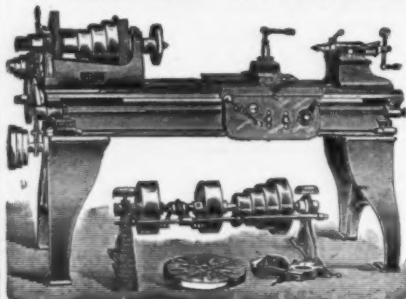
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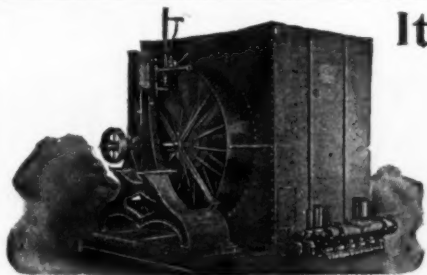
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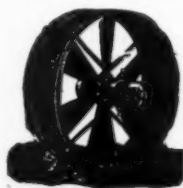
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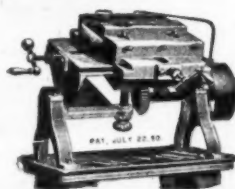
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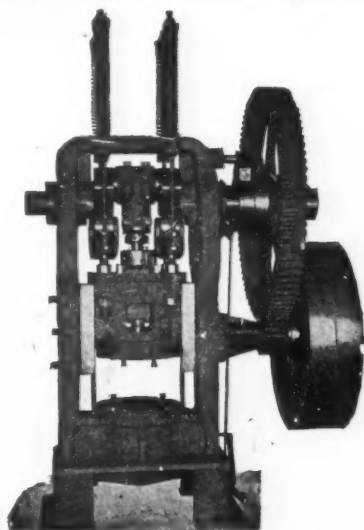
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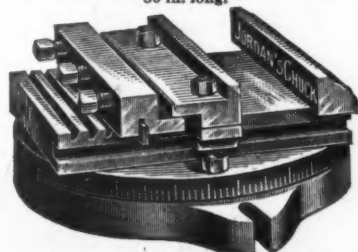
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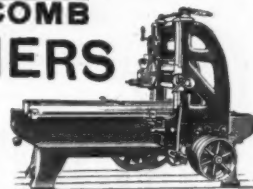
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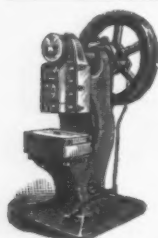
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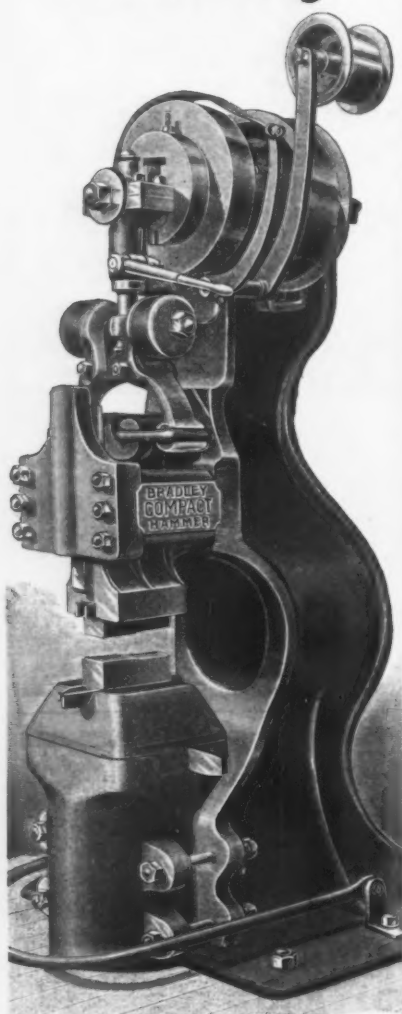
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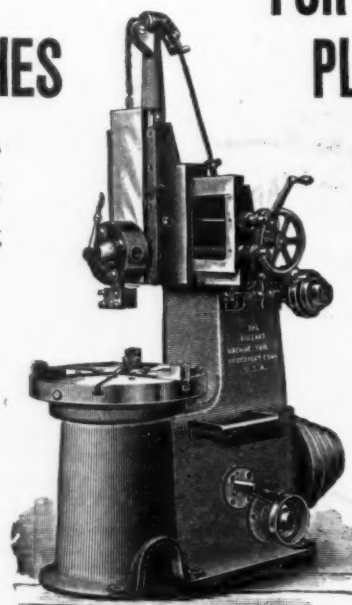
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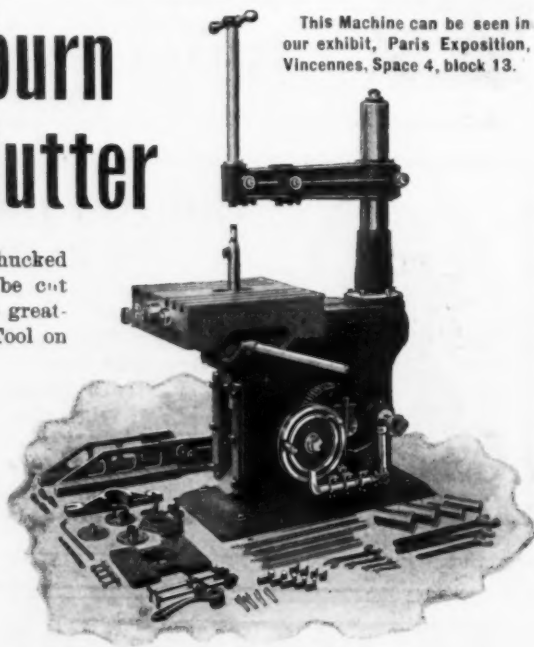
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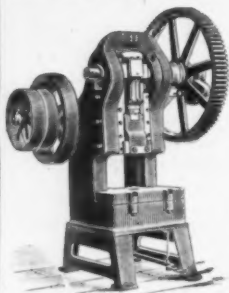
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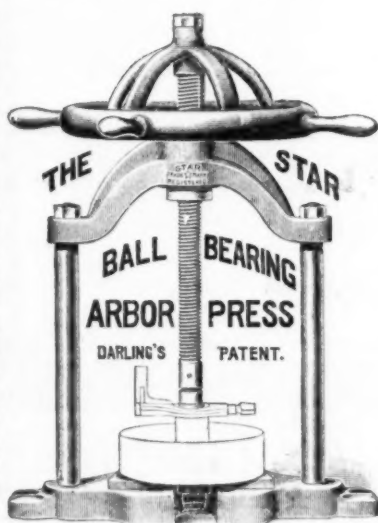


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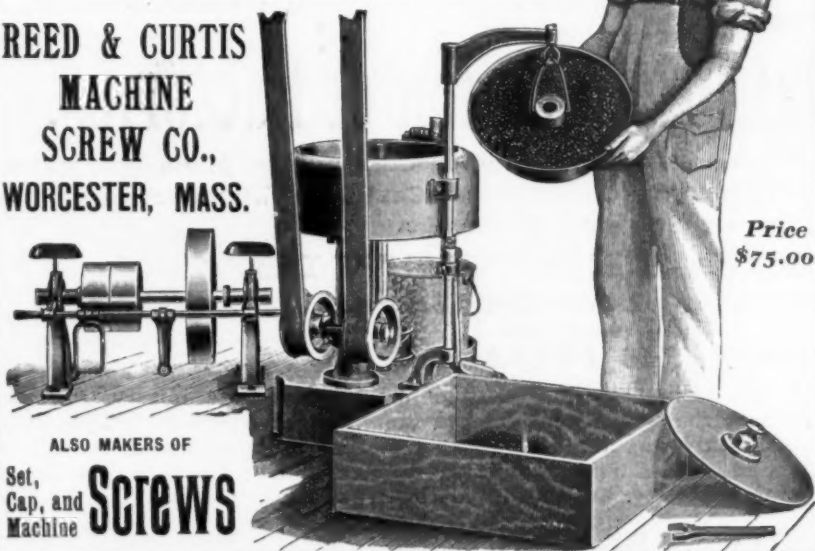
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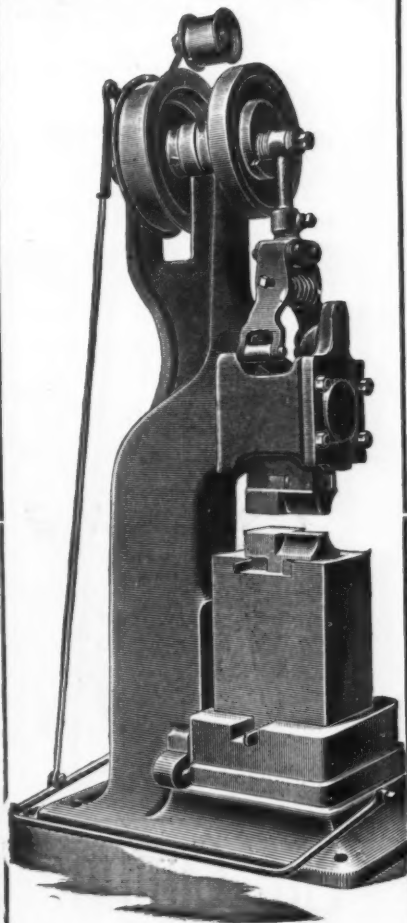
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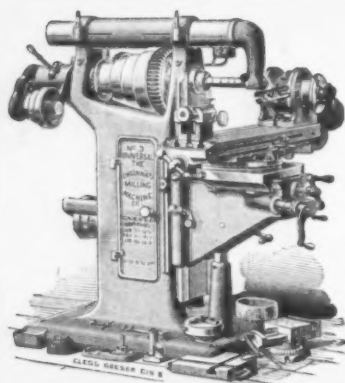
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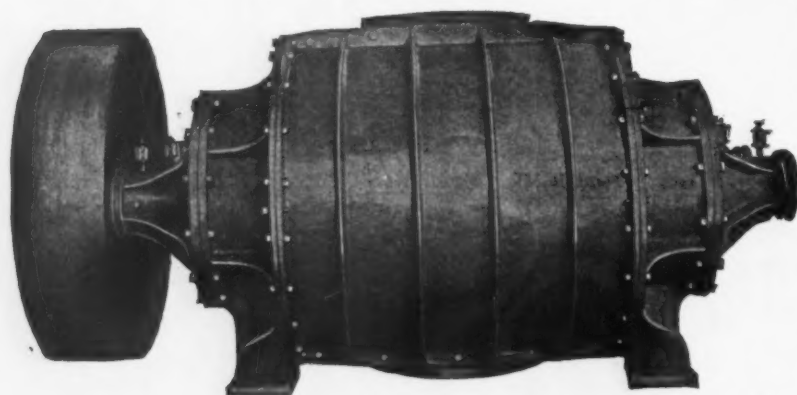
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CONTENTS BY CHAPTERS.

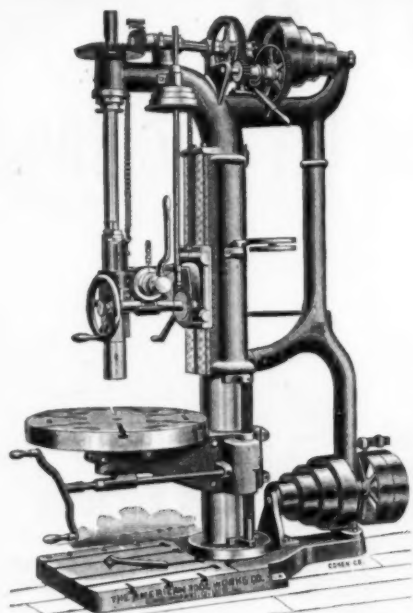
Introduction. 1.—The Directors. 2.—The Manager. 3.—The Secretary. 4.—The Auditor. 5.—The Accountant 6.—The Cashier. 7.—Correspondence Clerk. 8.—Supplies' Orders and Invoices. 9.—Customers' Orders and Invoices. 10.—Drawing Office. 11.—Estimating. 12.—Stationery. 13.—Advertising and Catalogues. 14.—The Works. Manager. 15.—The Inspector. 16.—The Entrance Gates and the Gatekeeper. 17.—The Stores and Storekeeper. 18.—The Warehouse and Warehouseman. 19.—Carriage. 20.—The Foremen. 21.—The Time-keeper and Job Clerk. 22.—The Paying of Wages. 23.—Establishment Charges. 24.—Stock Surveys 25.—Diagrams and Curves. 26.—Diagrams of Manufacturing Accounts and Balance Sheets. 27.—General View of Manufacturing Accounts. 28.—Synopsis of Transactions Relating to Purchases and Stores. 29.—Synopsis of Transactions Relating to Labor and Time. 30.—Synopsis of Transactions Relating to Manufacturing and Prime Costs. 31.—Synopsis of Transactions Relating to Warehouse Stock and Sales. 32.—Commercial Office (Orders and Invoices). 33.—Stores. 34.—Works and Job Office. 35.—Warehouse. 36.—Prime Cost and Ledger Clerk's Office. 37.—Balancing and Accounts. 38.—The Depreciation of Plant and Buildings. 39.—Recording Plant and Buildings. 40.—Foundry Accounts. 41.—Forge Accounts. 42.—Pattern Shop Accounts. 43.—Salaries and Expenses. 44.—Agents and Travelers. 45.—Pupils. 46.—Apprentices. 47.—Shipping. 48.—Samples, Patterns, &c. 49.—Miscellaneous. Appendix. Index.

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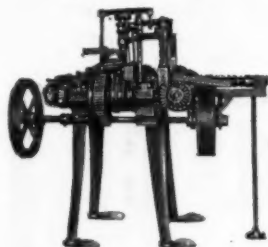
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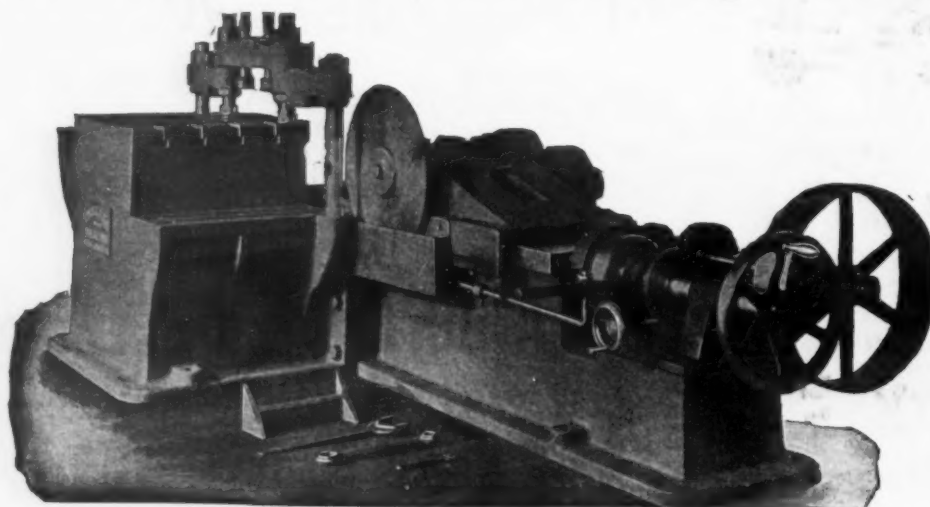
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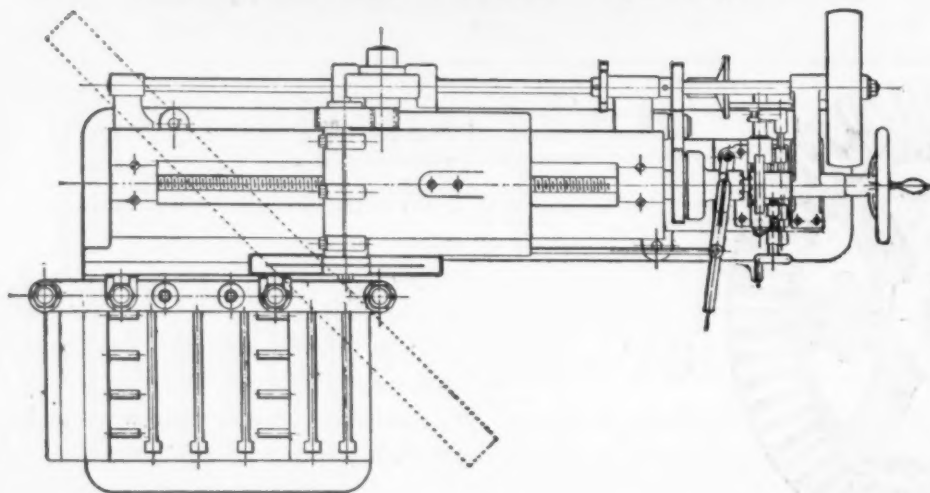
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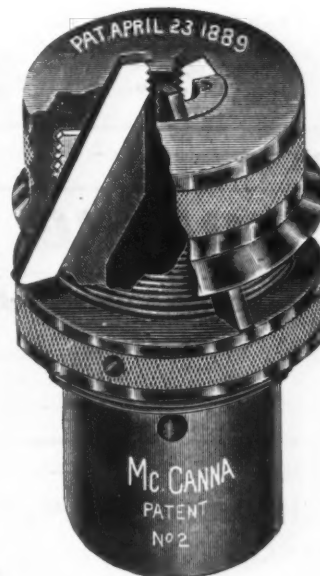
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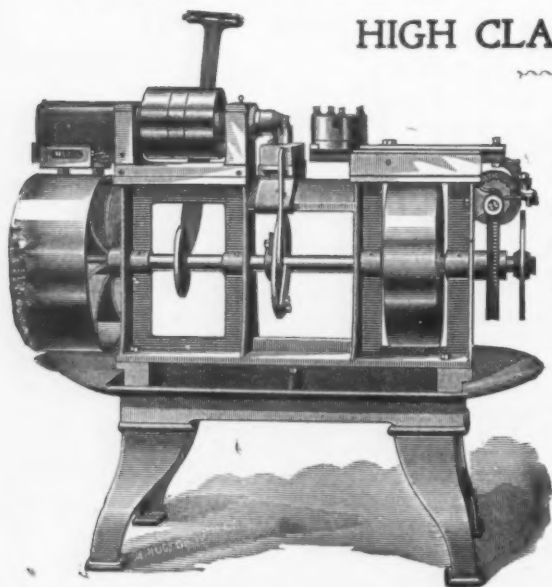
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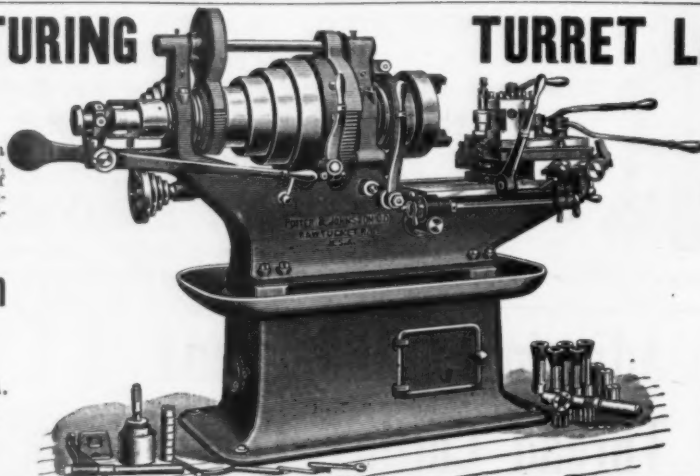
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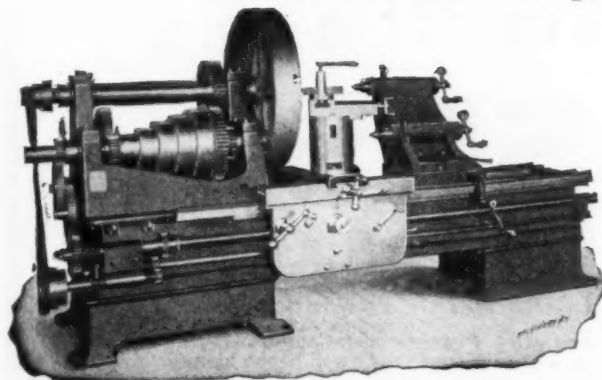
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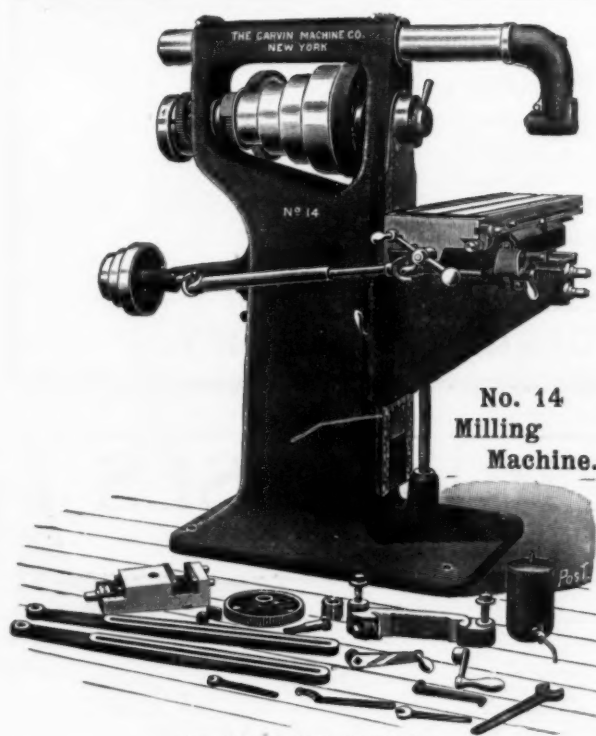
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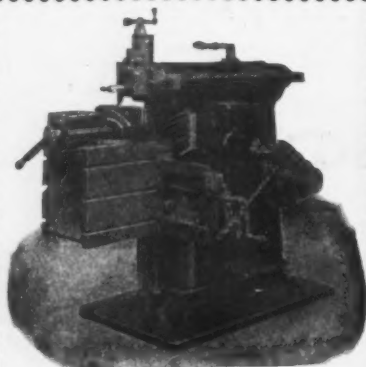
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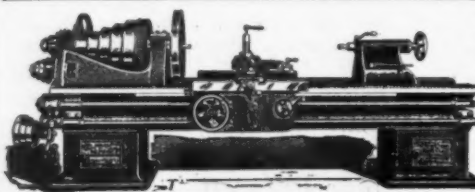
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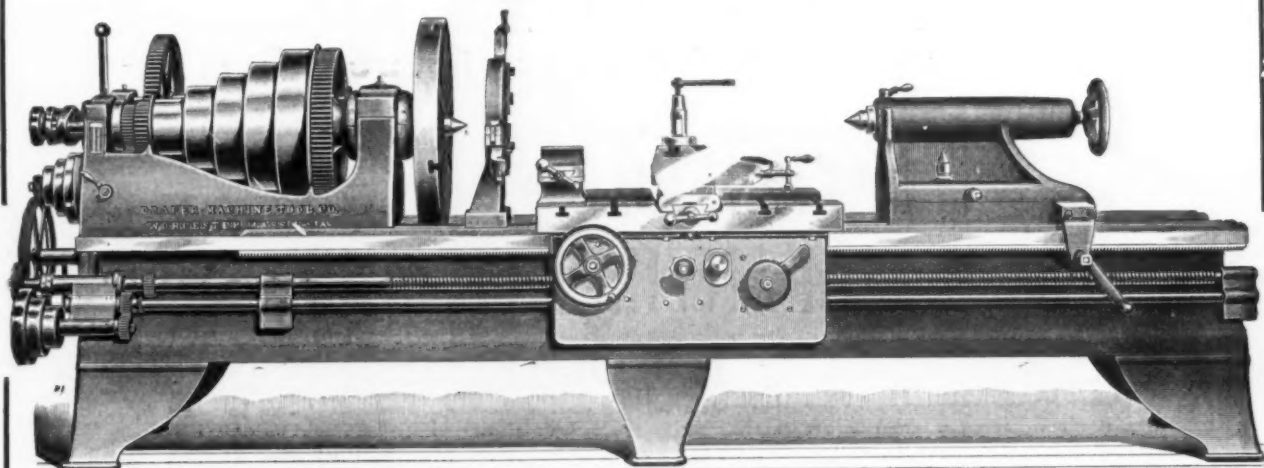
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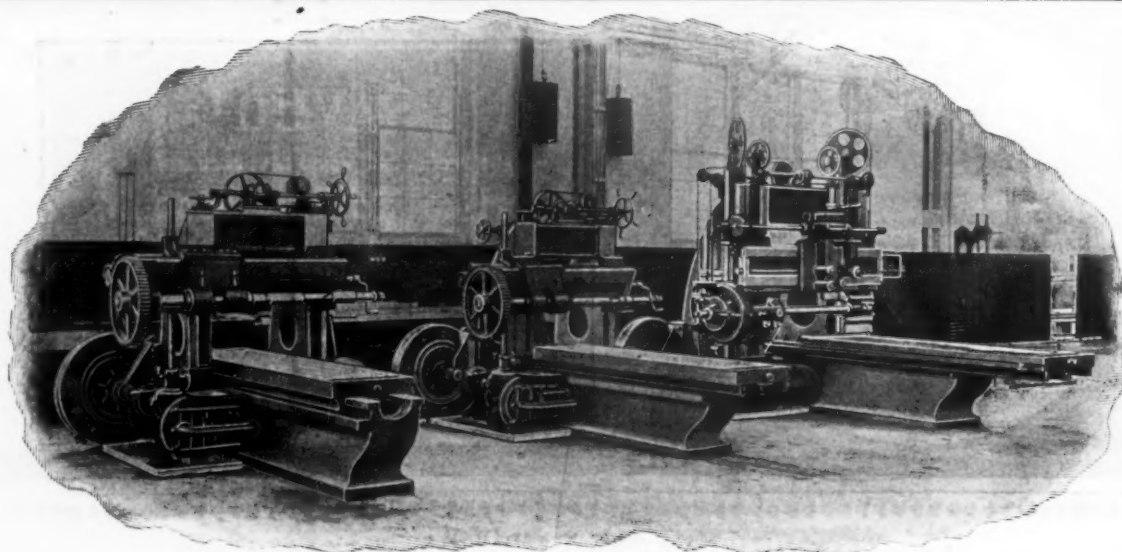
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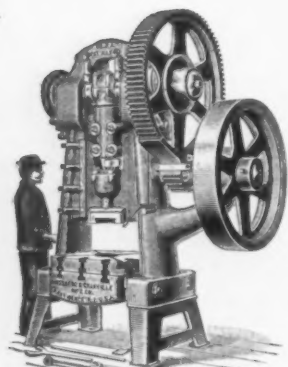
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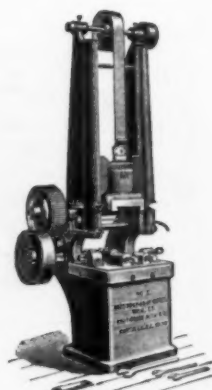
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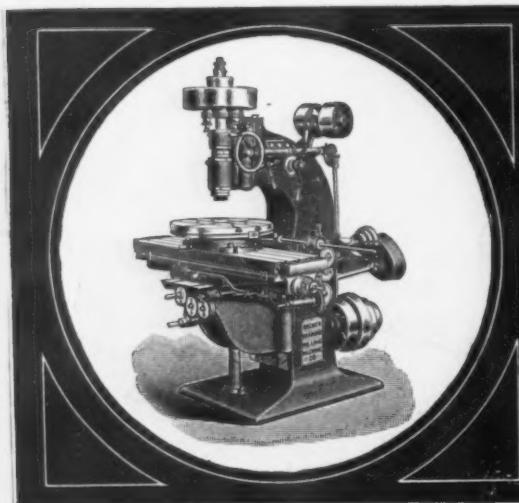
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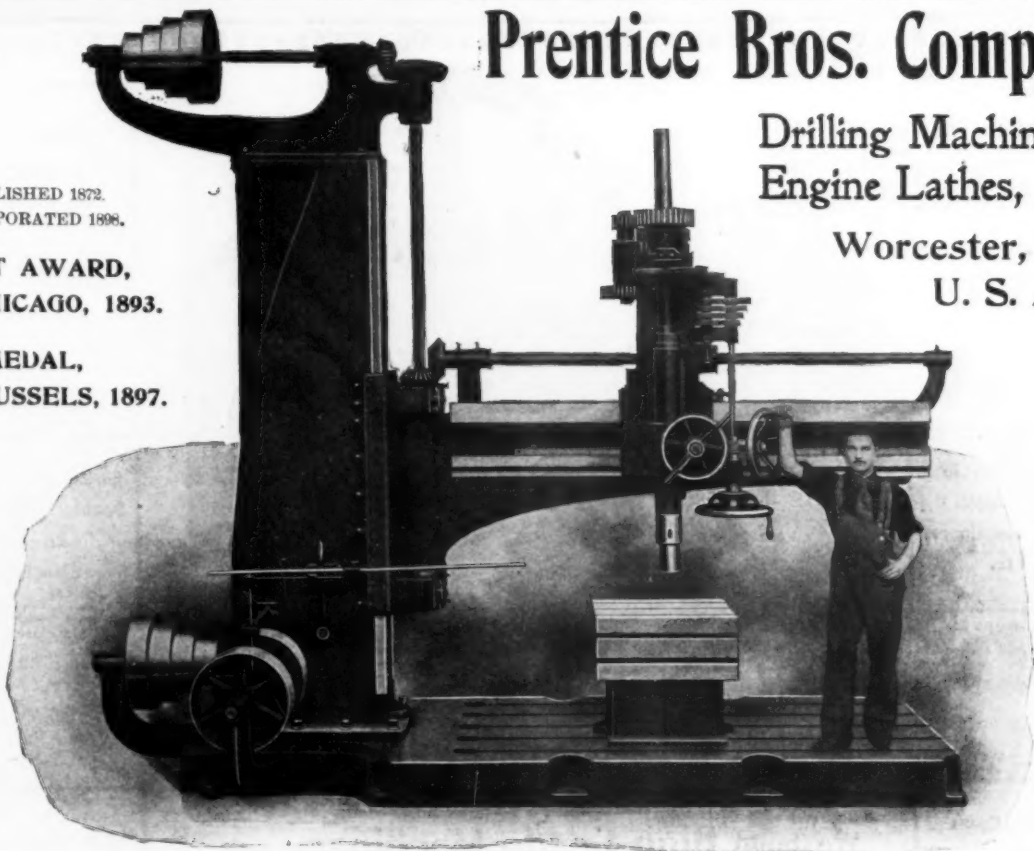
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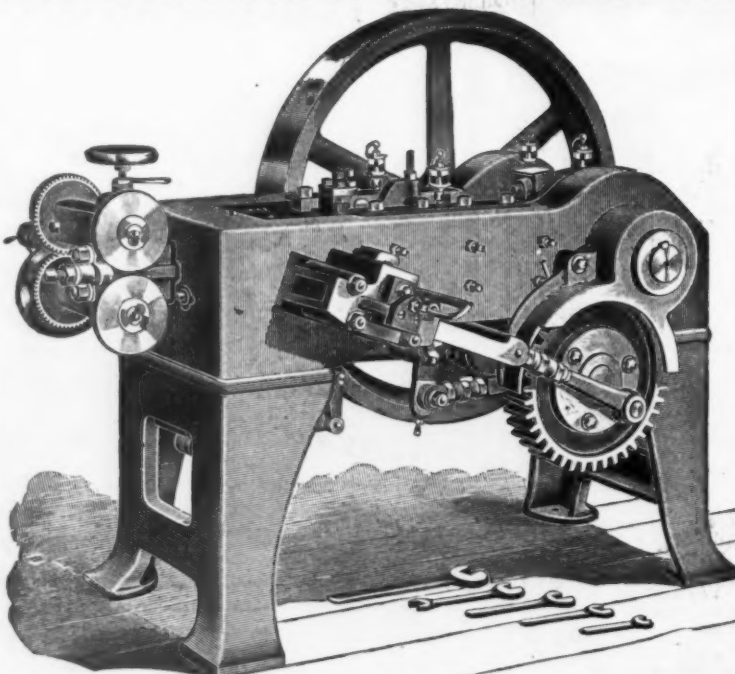
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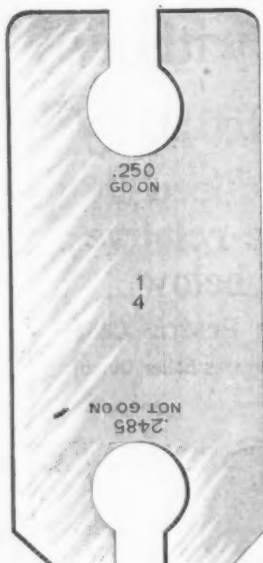
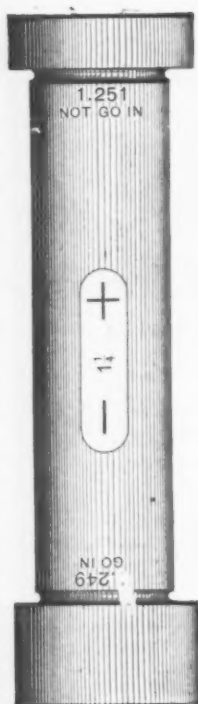
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New and Second-Hand Machine Tools.

Harrington Suspension Drill No. 1.

USED ONLY THREE MONTHS.

The Lodge & Shipley Machine Tool Co.,

Cincinnati, Ohio, U. S. A.

FOR SALE.

SUSPENSION DRILL,

Made by the Gleason Tool Co.

36 IN. x 36 IN. x 9 FT. IRON PLANER,

Made by Wheeler & Co.

GISHOLT TOOL GRINDER.

6 TON ELECTRIC TRAVELING CRANE, 25 ft. span,

Made by Yale & Towne.

5 FT. RADIAL DRILL,

Made by Universal Radial Drill Co.

ONE 37 IN. BORING MILL,

Made by the Baugh & Harris Machine Tool Co.

All First-class Condition.

HILL, CLARKE & CO.,

156 Oliver St., Boston.

We have a large stock of new tools.

SECOND-HAND MACHINERY.

- 1 62 in. x 60 in. x 22 ft. Planer.
1 48 in. x 48 in. x 14 ft. New Haven Planer.
30 in. x 30 in. x 8 ft. Planer, A1.
1 96 in. x 14 ft. Triple geared Lathe.
1 96 in. x 22 ft. triple geared Lathe
1 36 in. x 12 ft. " "
1 26 in. x 14 ft. Blaisdell Lathe.
1 22 in. x 18 ft. Pond Lathe.
1 12 in. Crank Shaper. Cheap.
1 6 H. P. Portable Engine and Boiler.
1 14 in. x 42 in. Morgan Steam Hammer
1 24 in. x 42 Four ton Steam Hammer.
1 Plate Planer, planes 18 ft. long.
1 800 lbs. Merrill Drop.
2 600 lbs. " "
1 25 lbs. Bradley Helve Hammer.
1 Combined Punch and Shear, cuts and punches 3/4 in.

NEW YORK MACHINERY DEPOT,

Office, 178 Broadway, N. Y.

BARGAINS.

- 13 in. x 9 ft. Engine Lathe, Stover.
14 in. x 6 ft. " " Putnam.
36 in. x 20 ft. " " "
9 in. Crank Shaper, Davis.
16 in. Crank Shaper, Gould & Eber.
28 x 28 x 6 ft. Planer.
60 x 60 x 16 ft. Planer, Hewes & Phillips.
24 in. B. G. Drill, New Haven.
28 in. " " Blaisdell.
Gang Drills, Speed Lathes, Sensitive Drills, &c.

If you wish to buy or sell, please let me know. Can give bargains in new and second hand machines at all times.

Geo. E. Affleck,

109 Liberty St., New York.

Second-hand Machinery.

ENGINE LATHES.

1 12 in. x 4 ft. Pond, R. & F.
1 12 in. x 5 ft. Young, plain
1 12 in. x 6 ft. Blaisdell, R. & F.

1 14 in. x 5 ft. Putnam R. & F. W. C.

1 14 in. x 7 ft. 6 in. Putnam R. & F. W. C.

1 14 in. x 8 ft. Porter R. & F.

1 14 in. x 5 ft. Robbins, R. & F.

2 16 in. x 6 ft. Ames, special features.

1 18 in. x 6 ft. Fuller, R. & F.

2 18 in. x 8 ft. Fuller, R. & F.

1 18 in. x 8 ft. Fitchburg comp. rest.

1 20 in. x 14 ft. Chamberlain, "old style."

1 28 in. x 10 ft. White, taper, "old style."

1 27 in. x 10 ft. D. W. Pond, comp. rest.

1 28 in. x 12 ft. W. L. & Co., comp. rest.

1 27 in. x 12 ft. W. L. & Co., plain back gear turning.

1 28 in. x 16 ft. Ditto.

1 36 in. x 16 ft. back gear turning.

1 40 in. x 16 ft. plain turning.

SPEED LATHES.

2 12 in. x 5 ft. B. G. Speed.

1 11 in. x 4 ft. " "

1 12 in. x 9 ft. " "

PLANERS.

2 24 in. x 24 in. x 4 ft. W. & L.

1 30 in. x 28 in. x 8 ft. Gay & Silver.

1 30 in. x 30 in. x 6 ft. White.

PRESSES.

1 No. 8 C. & M. Single.

1 No. 14 Stiles, heavy special.

1 No. 5 Blake & Johnson arch.

1 No. 82 S. & F. Foot.

Large stock new machines. Prices on application.

Two 20-ton Hand Traveling Cranes, 58 ft. 10 in. span.

THE NILES TOOL WORKS CO.,
136-138 Liberty Street, New York City.

2d-Hand Machinery

IMMEDIATE DELIVERY.

1 48 in. x 48 in. x 9 ft. Pond Planer, fine condition, one head.

1 48 in. x 32 in. x 8 ft. Wood & Light planer, one head.

1 44 in. x 44 in. x 12 ft. Niles Planer, one head.

1 36 in. x 34 in. x 12 ft. New Haven planer, one head.

1 34 in. x 32 in. x 8 ft. New Haven Planer, one head.

1 32 in. x 30 in. x 8 ft. New Haven Planer, one head.

1 32 in. x 32 in. x 8 ft. Pond Planer, one head.

1 27 in. x 27 in. x 5 ft. New Haven Planer, one head.

1 25 in. x 25 in. x 8 ft. Aldrich Planer.

1 20 in. x 20 in. x 5 ft. Sellers Planer.

1 150-ton Niles Hydrostatic Wheel Press.

1 24 in. Morton Key Way Cutter, fine order

1 18 in. Bement Slotted.

1 36 in. Gould Gear Cutter.

1 800-lb. Morgan Steam Drop Hammer.

1 24 in. Gisholt Turret Lathe.

1 2 x 34 Jones & Lamson Flat Turret Lathe.

1 36 in. x 27 ft. Putnam Engine Lathe, triple back geared standard pattern.

Send for new list just issued.

Large stock second-hand tools.

MCDOWELL, STOCKER & CO.,
59-61 So. Canal St., Chicago.

FOR SALE.

One piece of two inch diameter Pliable Steel Hoisting Rope, never been used, at a bargain.

The Thomas Laughlin Company,
PORTLAND, MAINE.

ELECTRIC PLANT

For Sale, 50 H.-P. Westinghouse 9 x 15 x 9 Compound Engine and 35 Arc Light Thomson-Houston Dynamo, with Spare Armature, also 25 H.-P. Westinghouse Engine. All in first-class order and cheap.

SCHULTZ & CO.,
Rothschild Bldg., Philadelphia.

2 BERRYMAN HEATERS
2nd HAND. LARGE AND SMALL.
F. L. PATTERSON, 136 Liberty St., N. Y.

Foundry and Machine Bargains.

1 15 Tons Yale Steel Jib Crane.

1 5 Tons Wooden Foundry Crane.

1 5 Tons Pillar Crane.

25 Tons 58 ft. Span Electric Traveling Cranes.

5 Small Wooden Jib Cranes.

1 No. 4 Baker Blower.

2 No. 9 Sturt't Pressure Blowers.

4 Sturtevant Exhausters.

2 3500 lb. Lads on 24 in. trucks.

1 30 in. x 48 in. Paxson Tumbler.

1 Hay Rope Twister and Spools.

1 2500 lb. Morgan Steam Drop Hammer.

1 2000 lb. Sellers Steam Hammer.

1 52 in. x 52 in. x 20 ft. Betts Planer.

1 18 in. x 12 in. x 36 in. Planer.

1 18 in. x 24 in. Crank Planer.

1 Sellers Axle Lathe.

1 Bement Bar Shear.

1 Double Punch, 1/2 in. x 1/2 in.

1 48 in. Bement Boring Mill.

1 48 in. x 8 ft. Pond Hor. Bor. Mill.

THOS. P. CONARD,

119 So. Fourth St.,
Philadelphia.

Notice.

Trustees' sale of Standard Sash and Door Co.; has been purchased by me. Large factory, fully equipped. Great bargain. Send for full list also large line of engines, boilers and pumps.

J. H. KERRICK,
Minneapolis, Minn.

IMMEDIATE DELIVERY.

12 Plain Vertical Engines, 5 to 50 H. P.
12 Plain Horizontal Engines, 10 to 150 H. P.
Automatic Engines, 15 to 300 H. P.
Direct Connected Engines, 15 to 300 H. P.
High grade and maximum efficiency.
Hoisting Engines from 6 to 50 H. P., single and double cylinders and drums.
10 20 in. Lever and Wheel Feed Drill Presses.
10 20 H. P. Boiler Feed Pumps.

PENNSYLVANIA MACHINERY CO.,
The Bourse, Philadelphia

FOR SALE.

2 Vertical Compound Corliss Engines, 30-36 x 36 wheels, 17 ft. x 50 in. face.

2 550 H. P. Tandem Compound McIntosh & Seymour Engines.

300 ft. 7-in. steel Shafting, with floor stands and couplings.

6 72-in. x 18 ft. Hor. Tub. Boilers, 120 pounds steam

3-ply leather Belting, 36 in., 42 in. and 48 in.

24-42 x 48 Cross Compound Wright Engine.

24 x 42 Watts Campbell Corliss.

32 x 60 " " " "

14 x 32 " " " "

Surface and Jet Condensers, Elevators, Dynamos,

Pumps, Hoisting Engines.

MARVIN BRIGGS,
12 Broadway, N. Y.

For Sale, Cheap

One 10 x 24 Corliss Engine. Also one No. 10 Davidson Steam Pump.

M. P. COLEMAN,

77 Haverhill St., Boston, Mass.

Engines for Sale.

1 28 x 30 horizontal piston valve engine, with 16 ft. band wheel in halves.

1 24 x 30 right hand piston valve engine, with 8 ft. band wheel in halves.

W. J. CARLIN COMPANY,

NEW YORK OFFICE: 514-515 Park Row Bldg., New York, N. Y.

610-611 Lewis Bldg., Pittsburg, Pa.

Machinery Bought, Sold and Erected.

Engines and boilers, all styles and sizes, both new and second-hand; machinery of every description for all purposes. Write to me for anything you want.

WM. GRUENDLER,
228 N. Main St. St. Louis, Mo.

Presses and Mills

One Arch Power Press with Dial Feed. Good Order.

One three spindle Lathe, 12 in. x 6 in. swing, 8 ft. bed, no countershaft. Good Order.

One Automatic Milling, Drilling and Tapping Machine for finishing battery sinks. Can be adapted for other work of a similar character. In A1 Order.

One No. 2 Plain Drop Press, fitted with 200 lb. hammer and power lifter, countershaft.

One Stand of Rolls, original size 10 in. diameter x 15 in. face, now slightly under size; in good order, including housings, pinions and main driving gear, designed to be driven from pinions on main line underneath the stand.

MOSSBERG & GRANVILLE MFG. CO.,

PROVIDENCE, R. I.

FOR SALE.

850 HORSE POWER HEINE WATER TUBE BOILERS,

TWO 350 H.-P. UNITS.
ONE 150 H.-P. UNITS.

Complete with McClave Shaking Grates, Breeching, full set of fixtures and trimmings.

May be inspected at West Side Power House, Rockford Edison Company, Rockford, Illinois.

Two 72 x 16 Tubular Boilers, 82 4 in. flues, breeching and 48 in. x 80 ft. stack. Built 1897. Hartford Insurance at 125 pounds pressure.

Two 66 x 16 Tubular Boilers, 58 4 in. flues, "A" breeching. Hartford Insurance at 100 pounds pressure.

Four 60 x 16 Tubular Boilers, 44 4 in. tubes; 100 pounds pressure.

Eight 44 x 16 Tubular Boilers, 32 4 in. flues, all fixtures and trimmings.

One 1200 H.-P. Berryman Feed Water Heater. Used two months. Built 1898.

WETHERILL CORLISS.

One right hand Wetherill Corliss Engine, cylinder 28 x 60; flywheel 20 feet diameter, weight 30 tons; shaft 15 in. x 12 ft. 6 in.; rope drive pulley 18 ft. diameter and grooved for 15 2-inch ropes; driven wheel 78 in. diameter grooved for 13 2-inch ropes; two iron idlers with boxes complete. With or without Independent Condenser 10x14x16.

20 in. x 24 in. Erie City "Class B" Automatic Cut-off Engine, balanced valve, left hand; Tangye bed, very heavy, weight complete, 40,000 lbs. 250 horse-power. Used four months.

W. W. WHITEHEAD,

DAVENPORT, IOWA.

One mile 6 in. Second-hand Pipe.
W. J. CARLIN COMPANY,
610-611 Lewis Bldg., Pittsburg, Pa.
NEW YORK OFFICE:
514-515 Park Row Bldg., New York, N. Y.

INVESTMENTS

Are offered by J. H. Hillman & Son, Empire Building, Pittsburgh, Pa., in the following first-class properties:

BLAST FURNACES IN PENNSYLVANIA.

No. 1, capacity 900 tons daily, now running, making over \$5 per ton profit. Can be turned over promptly. Will pay half the cost this year.
No. 2, capacity 200 tons daily, now running with big profit.

LAKE SUPERIOR (Mesabi) IRON ORE Lands.

Ready for operation August 1st.

TWO HUNDRED COKE OVENS AND Five Thousand Acres of coal lands in West Virginia.

FIFTY COKE OVENS AND COAL Lands on the Main Line of Pennsylvania Railroad.

CONNELLSVILLE COAL LANDS and Coke Ovens.

EIGHTY COKE OVENS AND CONNELLSVILLE coal in Connelville region.

FIFTY THOUSAND ACRES OF COKE-ing coal adjoining Connelville region. Nine foot vein in Fayette and Greene Counties, Pa. These lands offer the best investments now before the American public.

COAL MINING PLANT AND COAL Lands in Virginia.

Capacity 125,000 tons per annum. Now shipping East and West. Modern electric equipment. Coal is like Pocahontas smokeless used in the United States Navy. Being exported.

FIFTY THOUSAND ACRES OF KENTUCKY Coal and Timber Land At a low price.

WELL-KNOWN IRON PROPERTY IN Kentucky

With well-developed ore mines and millions of tons of ore in sight and has also a large number of farms on the Cumberland and Tennessee Rivers. This property contains 40,000 acres and is a principal in itself.

MANUFACTURING PROPERTY IN the Monongahela Valley.

THICK VEIN COAL IN THE MONONGAHELA Valley.

In the 3d, 4th, 5th, 6th and 7th pools of the Monongahela River.

SOMERSET COUNTY COAL LANDS.

In tracts of five, ten, twelve and seventeen thousand acres each, are cheap and are being sold rapidly to Eastern capitalists.

MANUFACTURING SITE AND COAL Lands on the Allegheny River.

On the Allegheny Valley Railroad is splendid property capable of prompt development.

CANADIAN IRON ORE MINES IN Operation.

A MODERN ROLLING MILL.

MANUFACTURING PROPERTIES and sites in Pittsburgh and Allegheny Cities, Pa.

For full information address

J. H. HILLMAN & SON,
Empire Building,
PITTSBURG, PA.

2d-HAND FEED WATER HEATERS.

Largest stock in America. Will be sold at bargains. These heaters are mostly taken in exchange for our improved Berryman (Kelley's Patent), "A Little Giant," vastly superior to all other feed water heaters, both as to results and durability.

BENJ. F. KELLEY & SON, 91 Liberty St., N. Y.

WANTED.

900 H. P. Vertical Engine; 5 and 12x12 tandem or cross compound engine; 75 to 200 H. P. Corliss engine steam shovels; half yd. steam digger; 3 ft. saddle tank locomotives and contractors' equipment.

FOR SALE.—Pair 14 x 36 Harris-Corliss; 24x56 Watts-Campbell; 18x12 and 21x12 New York Safety; 100 K. W. M. P., 3 80, 500, 300, 150, 50 light dynamos; 230 H. P. crane motors, speed 300; 15 H. P., 220 volt motor, slow speed; 4 Sturtevant exhausters; 3 Buffalo blowers. Steam shovels, hoisting engines, crushers, coal mining machinery and contractors' equipment. **SEND DESCRIPTION** any machinery wanted or for sale.

CHEBLBY MACHINERY CO., Havemeyer Bldg., N. Y.

BORING MILL FOR SALE.

17 ft. Bement Boring Mill.
W. J. CARLIN COMPANY,
610-611 Lewis Bldg., Pittsburg, Pa.
NEW YORK OFFICE:
514-515 Park Row Bldg., New York, N. Y.

MACHINE SHOP FOR SALE.

- 16 in. x 6 ft. Flather Lathe, compound rest and chucks.
- 3 14 in. x 6 ft. Guddard Lathes, with chucks.
- 15 in. Speed Lathe, Bausch & Harris, with slide rest and chuck.
- No. 4 Stark Lathe with turret, slide rest, milling attachments and chucks.
- No. 3 Stark Bench Lathe with slide rest and chucks.
- No. 8 Becker Vertical Miller with rotary table.
- 1 Stark Jewelers' Milling machine.
- No. 1 Brown & Sharpe Universal Milling machine.
- No. 4 Kempsmith Universal Milling machine.
- No. 1 Cincinnati Plain Milling machine.
- No. 1 Screw machine, Brown & Sharpe, Semi-Automatic.
- 16 in. Flather Crank Shaper.
- No. 3 Rudolph & Krummel Punch Press.
- 1 Heavy Geared Punch.
- 1 20 in. Wheel and Lever Drill and chuck.
- 1 24 in. Rack Geared and Power Feed Drill.
- 4 Barnes Sensitive Drills.
- 1 3-Spindle Sensitive Drill and chucks.
- 3 Tapping Machines.
- 8 Grinders.
- 1 Cincinnati Cutter Grinder.
- No. 1 Spencer Automatic Screw machine.

The majority of the above machinery is the very latest pattern, and has been used less than ninety days. We offer same as a whole or in lots to suit, together with one hundred Bench Vises, Hard Wood Benches, Iron Bench Legs, Motor, Forge and a large number of small Shop Tools.
Send for our new catalogue illustrating a complete line of new tools.

Marshall & Husehart Machinery Co.

62 and 64 So. Canal St., Chicago, Ill.
19 So. Water St., Cleveland, Ohio.
510 Johnson Bldg., Cincinnati, Ohio.

PARTIAL LIST OF Second-hand Machinery IN STOCK.

- 2 80 H. P., 60 in. x 16 ft. Tubular Boilers.
- 2 125 H. P., 66 x 18 Tubular Boilers.
- 1 60 H. P. Locomotive Boiler.
- 1 110 H. P. Locomotive Boiler.
- 1 150 Buckeye Automatic Engine, size 15x18.
- 1 125 Buckeye Automatic Engine, size 14x16.
- 1 150 Ball Automatic Engine, size 15x14.
- 1 100 Ideal Automatic Engine, size 13x12.
- 1 No. 12 Morris Centrifugal Sand Pump, direct connected to 12 in. vertical engine.
- 2 No. 6 Morris Centrifugal Sand Pumps.
- 1 16x10x10 Worthington Duplex Pump.
- 1 12x12x10 Worthington Duplex Pump.
- 1 12x12x10 Worthington Duplex Pump.
- 1 12x12x10 Worthington Duplex Pump.
- 1 No. 7 Knowles Pattern Single Pump.
- 1 No. 5 Knowles Pattern Single Pump.
- 1 Deane Duplex Power Pump, 5 in. plungers.

RAINIER & WILLIAMS,
64 So. Canal Street, Chicago, Ill.

FOR SALE—STEEL WORKS.

LOCATED ON TWO TRUNK LINES WITH RIVER FRONT.

10-ton Open Hearth Furnaces.
18-in. Train, with Engine.
16-in. Train, with Engine.
Boilers, Gas Producers, Heating Furnaces, Shears, Saws, and Machine Shop for repairs.
Plant can be run immediately **BARGAIN.**

W. J. CARLIN COMPANY,
610 and 611 Lewis Bldg., Pittsburg, Pa.
NEW YORK OFFICE:
514-515 Park Row Bldg., New York, N. Y.

FOR SALE.

A Double Annealing and Case Hardening Furnace of Brown & Sharpe's latest pattern. In just as good order as when new. Prices and terms very reasonable. Address

ECLIPSE BICYCLE CO.,
Elmira, N. Y.

BLOOMING MILL FOR SALE.

One 32 in. Reversing Blooming Mill with pair of 28 x 48 in. engines; also live tables, table engines, hydraulic manipulator, etc., built by Macintosh, Hemphill & Co.

W. J. CARLIN COMPANY,
610-611 Lewis Bldg., Pittsburg, Pa.
NEW YORK OFFICE:
514-515 Park Row Bldg., New York, N. Y.

2d-Hand Machinery Bargains.

Corliss, High Speed Automatic, Simple, Compound, Condensing and Slide Valve Engines; also Showing Engines, Boilers, Heaters, Pumps, Vacuum Pans, Ice Machines, Electric Motors, Generators, Railway Supplies, Metal Working and General Machinery.

CHAS. BEHLEN,
72 Trinity Place, N. Y.

Machinery Bargains.

One 8 x 16 Rice Auto. Engine.
11 x 11 Vertical Engine.
14 x 14 Marine Engine.
1 14 x 30 4-valve Auto. Engine.
18 x 24 Atlas Automatic Engine.
16 x 42 Corliss Engine.
One 24 x 24 ft. Shafting Lathe.
One 6 x 4 x 6 Duplex Pump.
One 70 H. P. Otis Steel Fire Box Boilers.
One 300 H. P. Berryman Heater.
1 200 H. P. Reynolds Heater.
1 200 H. P. Stillwell-Bierce Heater.
One 600 H. P. Rowe Feed Water Heater.
75 feet Double Leather Belt, 22 in.
90 H. P. Waste Heat, Vertical Boiler.
The above are all in first-class condition and ready for shipment.

A. L. DAWSON & CO.,
27-31 W. Washington St., Chicago Ill.

FOR SALE.

Mill and Contractors' Machinery.

- 1 25 ton Morgan Square Shaft 50 ft. span traveling crane.
- 2 Hydraulic Cranes.
- 1 Roll Lathe.
- 1 Hydraulic Press.

Machine Tools For Sale.

- 1 Suspended Drill Press with counter-shaft.
- 1 12 in. Fitchburg Shaper, sliding head.
- 1 9 in. Gould Shaper.

Engines and Pumps For Sale.

- 1 80 x 36 in. Vertical Corliss Rolling Mill Engine with 20 ft. fly-wheel.
- 7 Second-hand Steam Pumps
- 1 Centrifugal Pump.
- 3 Second-hand Hoisting Engines.
- A full line of New Engines, Hoisting Engines, Shears, Grinding Pans, Stone crushers and Contractors' Machinery.

THOMAS CARLIN'S SONS CO.,

386 River Avenue, Allegheny, Pa.

FOUNDRY EQUIPMENTS,

Second-hand, bought for cash; best price given for Cupolas, Blowers, Core Ovens, Cranes, Ladles, Tumbling Barrels, etc., etc. Give complete description.

THE J. D. SMITH FOUNDRY SUPPLY COMPANY,
CINCINNATI, O.

FOR SALE.

One 25 in. x 8 ft. Richard's Open Side Planer, made by Pedrick & Ayer Co. In use since 1893. Address "OPEN SIDE," care *The Iron Age*, New York.

FOR SALE.

Half interest in an established machine shop; modern plant, good line, several months' orders ahead; the best of reasons for selling. At least \$15,000 required.

"MACHINERY,"

Care Secretary Board of Trade,
Worcester, Mass.

FOR SALE OR TO LET.

Drop Forge Works, building 40 x 150 ft., all fitted up with modern tools. 3 Drops. 3 Power Presses. Machine Shop. Japanning Plant. Shears. Brick Boiler House. 2 Steel 40 horse-power Boilers. 1 50 horse-power Engine. Complete Oil-Fuel Plant. Side track in yard, no shifting charges. For information address
F. A. FISHER, Gloucester, Mass.

SECOND-HAND.

60 and 80 lb. Bradley Helve Hammer.
No. 6 Root Blowers.
8 in. x 12 in. x 12 in. Gordon Duplex Air Compressor.
Pedrick and Ayer Horizontal Boring Machine.

Send for our No. 5 list, just out, of new and second-hand machinery.

DAWSON & GOODWIN, 41 S. Canal St., Chicago

WANTED.

12, 18 or 20 inch three high Bar Mill.
W. J. CARLIN COMPANY,
610-611 Lewis Bldg., Pittsburg, Pa.
NEW YORK OFFICE:
514-515 Park Row Bldg., New York, N. Y.

35th and Iron Sts., CHICAGO.

FOR SALE.**SPECIAL ENGINES.**

- 1 14 in. x 30 in. (Vertical) Slide Valve.
- *1 14 in. x 30 in. Keystone Corliss (brand new).
- *1 11 in. and 19 in. x 24 in. Tandem Comp'd "Buck-eye" (latent type) with condenser.
- *1 22 in. x 42 in. Wetherill Corliss.
- *1 23 in. x 48 in. Geo. H. Corliss make.
- 1 24 in. x 36 in. Mackintosh, Hemphill & Co.
- 1 36 in. x 60 in. Tangye Red type.
- 1 Crane Elevator Co. Modern Elevator Engine.

BOILERS.

- 3 Horizontal Tubular, 72 in. x 16 ft., with 84 3/4 in. tubes, approved for 100 lb. pressure, complete.

SHAFTS and PILLOW BLOCKS

- 15 Very fine Forged Shafts, finished all over, 10 in. diam. to 16 in.

FLY WHEELS For Balance and for Belts.**SMOKE STACK.**

- Very fine steel self-supporting stack, 64 in. diam., 100 ft. high, with one casting, ornamental top and ladder.

HAMMER.

- 1 Hackney Cushion Hammer.
- 1 120 lb. Double Frame Steam Hammer
- 1 4 ton do.

SHARS.

- 1 New Alligator Shear with capacity up to 2 1/2 in. Cold Billets, or for Scrap cutting. Knives 14 in. long.

LOCOMOTIVES, New and Second-Hand

- *Signifies Right-hand.
- †Signifies Left-hand.

B. M. EVERSON,

German Nat. Bank Bldg (6th and Wood),
Sales Agent for PITTSBURG, PA.
Baldwin Locomotive Works, Phila.

For Sale.

One 25-ton 50 ft. span, MORGAN Square shaft Crane, in good condition and ready for immediate delivery.

THOMAS CARLINS' SONS CO.,

386 River Avenue, Allegheny Pa

SPECIAL SALE OF Bolt and Nut Machinery.

All in good condition and most practically new.

- 1 Olsen 2 in. Bolt Header.
- 1 National 1 1/4 in. Double Bolt Cutter.
- 1 Acme 1 1/4 in. Double Bolt Cutter.
- 1 National 1 in. Single Rapid Bolt Cutter.
- 1 Olsen 4 spindle 1 1/4 in. Geared Nut Tapper.
- 2 Sensitive Tapping and Threading Machines for 3/4 in. and smaller.
- 1 Sensitive Tapping and Threading Machines for 1/2 in. and smaller.
- 1 Chapin 300 lb. Drop Hammer.

Above tools and others at a bargain.

VONNEGUT HARDWARE CO.,

Metal and Woodworking Machinery,
Indianapolis, Ind.

FOR SALE.

Two vertical blowing engines, built by Robert Allison, in excellent condition; the following dimensions, 31 in. x 72 in. x 84 in. and 40 in. x 80 in. x 84 in. Address "S. H.," care *The Iron Age*, 117-119 South 4th St., Philadelphia, Pa.

WANTED

A Small Portable Iron Annealing Furnace, second-hand.

ALBERT KRIMMERT,

Bowling Green Bldg, New York.

Corliss Engines For Sale.

2 34 x 60 Horizontal Engines, one right hand and one left hand. These engines are now coupled to one shaft, but would furnish with fly wheel or band wheel to suit each separately.

1 24 x 36 Horizontal Engine with 20 ft. band wheel.

W. J. CARLIN COMPANY,

610-611 Lewis Bldg.,
NEW YORK OFFICE: 514-515 Park Row Bldg.,
Pittsburg, Pa.
New York, N. Y.

FOR SALE, CHEAP.

one ten ton Steam Roller made by the Harrisburg Foundry & Machine Works, first-class condition.
SMITH & CAFFEY,
Syracuse, N. Y.

FOR SALE.

One Pond Planer, 36 x 36 x 17 ft.

One New Haven Lathe, 25 in. swing, 17 ft. bed.

One Vertical Engine 14 x 14, roughtry valve, self contain.

One Sturtevant Steel Blower, 68 in. high 26 inlet, 22 outlet.

Also one Atlas 10 x 12 Engine.

Also a large lot of iron tanks.

WM. ECKBOLDS' SONS,

711 E. Girard Ave., Philadelphia.

FOR SALE.

One Corliss Engine, 26 in. x 60 in., fly wheel 24 ft. diameter, section of rim 15 1/4 in. x 11 in. One Multiple Drill Press, four spindles, 8 ft. between housings, built by Messrs. Bement, Miles & Co. for drilling holes in plates.

Five trains of plate rolls. One 9 ft Flywheel, new, 7 in. bore, weight 6600 lbs. Two Bliss Guillotine Upright Shears, 72 in. gap, 9 in. stroke. One Dean Duplex Pump, 6 x 5 1/4 x 6. One Rod Straightening Machine, built by the Medart Patent Pulley Co. for straightening rods up to 3 in. diameter and 25 ft. long. A lot of extra cold and hot plate rolls (new) and numerous other items from the Olney Copper Plant.

HENRY A. HITNER'S SONS,

Gaul and Sargeant Sts., Philadelphia.

RECEIVER'S SALE.

Property of the Lavigne Automatic Manufacturing Co., New Haven, Conn.

Pursuant to an order of the Superior Court for New Haven county, the undersigned hereby offers for sale all the property of said company remaining in his hands as receiver, which includes the interest of said company in land with factory buildings thereon, Nos. 157 to 161 River street, New Haven, and machinery, tools and stock. Said company is engaged in the manufacture of Automatic Screw Machines, Adjustable Drill Presses, Tapping and Threading Machines, Special Machinery, Yacht Cannon, Planes, Wrenches and Bicycle Pedals.

Bids will be received in writing until June 4th 1900, inclusive, and may be made for the property as a whole, or separately for the real estate and all or parts of the machinery as classified by the undersigned.

For complete descriptions and lists of said property and full information, and for terms and conditions of sale apply to

FREDERICK C. LUM, Receiver,

42 Church st., New Haven, Conn.

Rails and Dump Cars

50 lb. Steel Relayers, 150 tons.

79-lb. Steel Relayers, 150 tons.

For immediate shipment.

16 Stand Gauge Side Dumps, 8 to 12 yds. capacity.

1 20 Tons Saddle Tank Locomotive.

THOMAS P. CONARD,

119 So. Fourth St., Philadelphia.

FOR SALE—BAR MILL.

12 in. 3-high Bar Mill.

9-in. 3-high Bar Mill

12-in. Cold Rolling Mill.

Corliss Engines coupled direct to trains.

Tubular and Waste-heat Boilers.

Heating Furnaces

Shears, Saws, Cooling and Straightening Beds, etc.

5 acres of ground.

Building, 237 x 121 ft.

Brick Building for additions, 360 x 80 ft.

Connections with four railroads.

Above plant is located in thriving Ohio town.

W. J. CARLIN COMPANY,

610-611 Lewis Bldg., Pittsburg, Pa.

NEW YORK OFFICE:

514-515 Park Row Bldg., New York, N. Y.

WANTED IMMEDIATELY.

Standard Gauge Locomotive, weighing about 20 to 27 tons. State price, condition, location. Must be cheap for cash.

"ROOM 723."

Reaper Block, Chicago Ill.

FOR SALE, SECOND-HAND TOOLS.

One "Newton" Cold Saw.

Three "Bryant" Cold Saws.

One "Whitecomb" Planer, 37 in. x 36 in. x 9 ft.

One "Cockburn" Concrete Mixer.

One "Sturtevant" Blower, No. 8.

One do. do No. 5.

Two Horizontal Tubular Boilers, 66 in. x 16 ft. with 90 three-inch tubes, now running under 80 lbs. pressure.

ALSO

NEW CORNELL BLOWERS—Poole's patent, all sizes—the best in the market—send for prices.

J. B. & J. M. CORNELL,

26th St. and 11th Ave., New York City.

1 20 in. x 48 in. Corliss Engine. 1 8 in. x 12 in. Ames. 1 8 in. x 12 in. Erie. 1 7 in. x 10 in. Porter. 1 6 in. x 10 in. Payne. 1 4 in. Morris Tasker Pipe Cutting and Threading. 1 Blaisdell Back Gear Drill, 30 in. 1 125 Horse Horizontal Boiler. 3 30 Horse Upright Boilers. 1 Boiler Plate Planer, 16 ft., made in Scotland. 1 Hydraulic Riveting Machine, 86 in gap 1 48 in. Swing Lathe, short bed. 2 Double Belts, Hoyt's make, 104 ft.; one 86 ft. x 18 in.

ROBERT J. GRAY, 52-54 East 134th St., New York.

Where to Locate.

Manufacturers using iron, steel or wood will find the best locations for successful plants along the

SOUTHERN RAILWAY.

These locations lead in cheap raw material, cheap, contented and desirable labor, cheap fuel and in good facilities for marketing products. Opportunities now open for establishing new plants are fine and should be investigated. Other investments will prove profitable in the South.

M. V. RICHARDS,

Land and Industrial Agent, Southern Railway,
WASHINGTON, D. C.

FOR SALE.

7000 ft. Light Weight 11 in., 13 in. and 15 in. Pipe
160,000 ft. Standard Pipe, all sizes.
36 Boilers from 6 H. P. to 125 H. P.

ENGINES, SLIDE VALVE.

- 1 16 x 20 Center Crank Erie
- 1 16 x 24 Warren.
- 1 14 x 20 Woodbury & Booth.
- 1 Pair Twin 12 x 15 McCune.

ENGINES, AUTOMATIC.

- 1 20 x 48 Wheelock Corliss.
- 1 12 x 20 Atlas.
- 1 16 x 24 "
- 1 12 x 14 Rees.
- 4 11 x 11 Westinghouse.
- 3 20 H. P. Foos Gas Engines.

McDOWELL & CO.,

347 Fifth Ave., Pittsburg, Pa.

ENGINES and BOILERS.

- 3 60 in. x 18 ft. Tubular Boilers.
- 1 12 in. x 36 in. Lane & Rodley Corliss Engines.
- 1 12 in. x 18 in. Russell Automatic Engine.
- 1 14 in. x 20 in. Atlas Automatic Engine.
- 1 20 x 24 Rolling Mill Engine.

Send for list of over 150 refitted Boilers and Engines.

W. D. NORTON,

6th and Carr Sts., Cincinnati, O.

WANTED.

Small staple or patented articles to manufacture. Cash paid for acceptable ideas.

Address "X. O. B."

Care *The Iron Age*, New York.

FOR SALE. STOCK OF HARDWARE.

Invoice \$7000.00 to \$8000.00 in a city of 4000 inhabitants; only two hardware stores; an elegant location. Reason for selling is we are going into the Manufacturing Business.

SPRANKLE HDW. CO., Kendallville, Ind.

Drop Forging Machinery and Die Stock For Sale.

600 lb. to 1800 lb. Pratt
& Whitney drops, with
Trimming Presses for
each.

Bradley Strap and Helve
Hammers, also a consid-
erable amount of Die
Stock.

Specially low prices to
close these out.

Correspondence solicited.

J. STEVENS ARMS AND TOOL CO.,

P. O. Box 46,

CHICOPEE FALLS, MASS.

FOR SALE.

Two 60-inch by 16 feet Peter Ammerman & Son
Boilers, guaranteed 80 pounds pressure. Also one
Woodruff & Beach 16 x 36 Engine. The above are
all in first-class condition, and can be seen at our
factory.

UNION MANUFACTURING COMPANY,
New Britain, Conn.

Machinery Bargains.

DOUBLE ENGINES.

18 x 42 Slide Valve, horizontal box, bed plate,
shaft 8 3/4 in. diameter, double cranks, 3 1/4 in.
pins, built by Starbuck, with or without
belt wheel. \$1,200 00.

PLANERS.

48 x 48 x 16 ft. bed, made by Rollins, Nashua,
N. H. Price, \$800 00.

34 x 34 x 15 ft. bed, made by Fairbanks, Provi-
dence, R. I. Price, \$500 00.

LATHES.

Two 16 in. swing, 6 ft. bed, made by Putnam.
Price, \$125 00.

One 15 in. swing, 6 ft. bed, made by Wood &
Light. Price, \$125 00.

Two 15 in. swing, 8 ft. bed, made by Campbell &
Gage, Waterford, N. Y. Price, \$125 00.

One 17 in. swing, 8 ft. bed, made by Campbell &
Gage, Waterford, N. Y. Price, \$125 00.

One double head lathe, 32 in. swing, 20 ft. bed,
made by Campbell & Gage, Waterford, N. Y.
Price, \$500 00.

F. O. B. cars, Philadelphia, Pa.

A. V. KAISER & CO.,

222 South Third St., Philadelphia.

SHOPS For Rent

OVER 40,000

Sq. Feet of Floor Space.

Six Buildings, stone and brick
construction, located at Hazelton,
Pa., on the line of the Lehigh Val-
ley R. R., suitable for foundry, ma-
chine shops, or plant of any nature.
Formerly occupied by L. V. R. R.
as machine and car shops.

Will rent at an extremely low
figure.

For full particulars address

THOS. W. HULME,

Asst. Real Estate Agent,

L. V. R. R. Co.,

228 So. 3d St., Philadelphia, Pa.

MACHINERY.

SECOND-HAND, FIRST-CLASS ORDER.

3-16 in. Adt Bench Rotary Wire Straightener with
loose pulley, five dies on stand.

1/4 in. Adt Automatic Wire Straightener and Cutting-
off Machine 16 in. lengths and under.

1/4 in. Adt Long Cut Automatic Wire Straightener and
Cutting-off Machine 9 ft. and under.

50 lb. Power Hammer (Dinelt & Eisenhardt).

25 lb. Bradley Helve Hammer.

40 lb. Bradley Helve Hammer.

500 lb. Merrill Board Lift Automatic Drop Hammer.

1300 lb. Morgan & Williams Double Standard Steam
Hammer.

800 lb. Pratt & Whitney Board Lift Automatic Drop
Hammer.

No. 7 Jarecki Pipe Machine.

3-16 in. Adt style "D" Riveting Machine.

4 in. to 6 in. Curtis Pipe Machine, hand and power.

Single spindle Profiler (Garvin).

No. 1 Warner & Swasey Screw Machine with wire
feed.

No. 1 Bliss Foot Press.

No. 2 Plain Milling Machine (Reed).

Brown & Sharpe Polishing and Finishing Lathe.

No. 3 Garvin Hand Miller.

No. 2 Garvin Hand Miller.

No. 10 Kemp-Smith Hand Miller.

C. C. WORMER MACHINERY CO.,

Ft. of Shelby Street, Detroit, Mich.

FOR SALE.

A small foundry 18 miles from New York, with
advantageous railroad facilities. Small plant, ex-
cellent location, almost new; every convenience
Gray iron capacity about 25 tons per day. Malle-
able iron capacity 8 tons per day. For full par-
ticulars call upon or write.

J. W. WOOLFOLK,

35 Nassau Street, New York.

Wanted to Make

We have a complete modern manu-
facturing plant near Boston, equipped
with Power Presses, Automatic Screw
Machines, Nickel Plating and Polishing
Plant and want to correspond with
parties having articles that can be made
in such a factory. Address

"W.,"

care The Iron Age, 70 Kilby Street,
Boston, Mass.

Hammers.

Two Hammer bargains this week:

One Bradley 25-lb. Helve Hammer.
Good as new. Price \$150.

(Compare this with new price.)

One 25 lb. Shaw & Justice Power Ham-
mer. Is in good running order. Price
\$50.

These prices are F. O. B., Cleveland.
Terms cash before shipment. First come,
first served.

WM. A. READE & CO.,

216 and 217 American Trust Bldg.,

Cleveland, Ohio.

Successors to READE & BOWLER.

State of New York—State Commission in Lunacy.

NOTICE TO CONTRACTORS.

Sealed proposals for furnishing and installing win-
dow guards at the Manhattan State Hospital, Ward's
Island, New York, may be sent by mail or delivered
in person up to 4 o'clock, P. M., on Monday, the 4th
day of June, 1900, to Henry E. Howland, President,
Board of Managers, Manhattan State Hospital, No. 1
Madison Avenue, New York City, at which time and
place the Board of Managers will receive and open
all proposals.

Drawings and specifications may be consulted and
blank forms of proposals obtained at the office of
the Board of Managers, No. 1 Madison Avenue, New
York City, or at the office of G. L. Helms, State Archi-
tect, in the Capitol at Albany, N. Y.

Contract will be awarded to the lowest responsible
and reliable bidder, unless the bids exceed the amount
of funds available therefor, in which case the Board
of Managers reserve the right to reject all bids.

HENRY E. HOWLAND,

President Board of Managers.

New York, N. Y., May 22d, 1900.

FOR SALE.

Profitable wholesale-retail general Hardware busi-
ness, long established, in perfect running order.
Stock \$18,000, could reduce to \$12,000 quickly. Cap-
ital opportunity cash buyer. Correspondence and
inspection invited. Address

GRISWOLD, MALONEY & CO., Owners, Elmira, N. Y.

TELEPHONES 2440, 2441 AND 2442 BROAD.
B. NICOLL & COMPANY,
59 AND 61 WALL STREET, NEW YORK.
WIRE RODS,
BILLETS.
IRON ORE and MILL CINDER.
FOUNDRY, FORGE, BESSEMER and BASIC PIG IRON.
Steel and Iron Scrap for Open-Hearth Furnaces Bought and Sold.
Furnace Agents, Exporters and Importers.

FOR SALE FROM STOCK.

TWENTY HOISTS.
DOUBLE CYLINDER HOISTING ENGINES
TWO STEAM HAMMERS.
TWELVE STEAM PUMPS.
 Duplex.

TWENTY ENGINES.
ELEVEN CENTRIFUGAL PUMPS.
 (New and Second-Hand.)
SIXTEEN HOISTING TUBS.
TWELVE TON HARRISBURG & COLUMBIA
STEAM ROAD ROLLERS.

IRON WORKING MACHINERY.
WOOD WORKING MACHINERY.

CARLIN MACHINERY & SUPPLY CO.,
 JOHN H. CARLIN, Prop.
 Old No. 186 Lacock St., Allegheny, Pa.
 New Nos. 101-109 Lacock St
 L. D. Phone, 233.

TO RENT.

The second and third floors of a three-story brick building, each floor 40 x 150 ft. Has electric power and lights, steam heat, freight elevator, automatic sprinklers. Is especially adapted for manufacturing purposes. This building is situated in the City of New London, Ct., on line of N. Y., N. H. & H. R. R., and has a water front and dock privileges. Three minutes' walk from railroad station. For full particulars inquire of

NEW LONDON GAS AND ELECTRIC CO.,

29 Main St., New London, Ct.

FOR SALE OR RENT.

Large Foundry Plant fully equipped. Has exceptional shipping facilities over two belt and one trunk line railroads. Located just outside Chicago. For particulars address

"FOUNDRY PLANT,"

Care *The Iron Age*, 805 Fisher Bldg., Chicago.

WANTED.

Four wheel, saddle tank, standard gauge, switching Engine; weight on drivers 50,000 to 60,000 lbs.; rigid wheel base not to exceed 6 ft. 6 in. complete with power brake, injectors, etc. Hauling capacity 1200 to 1500 tons on a level. Must be in good condition.

J. B. & J. M. CORNELL,

26th St. and 11th Ave.,

New York City.

FOR SALE.

Two 5-ton Steel Jib Cranes, new, double braced, length of gib 28 ft. height under gib 19 ft., compound geared, 24 ft. under the strut. We can make delivery at once
 One Foundry Ladle fitted with worm gearing, capacity 4½ tons. Second-hand
 One Turret Lathe, 6½ ft. bed, 18 in. swing. Lodge-Davis. Countershaft. Second-hand.
 One 16 in. Mill, three stands of housings, 63 rolls. Second-hand.
 Muck Mill and Squeezer. Second hand.
 One 18-ton Foundry Ladle, geared, only been used one-half dozen times, good as new. Can give prompt shipment.
 One Special "bear for cutting shovel blanks. Full set of dies for canal scoops, etc. Immediate shipment.
 Address **UNION FOUNDRY & MACHINE CO.,**
 Pittsburg, Pa.

FOR SALE.

A number of 60 in. x 18 ft. Tubular Boilers. In good condition for immediate delivery.

ARMOUR & CO.,

205 LaSalle St., Chicago.

Valuable Rolling Mill Property**FOR SALE.****POPES ISLAND MFG. CORP.**

New in Active Operation,

Situated in New Bedford, Mass.

This property consists of valuable real estate, about 7 acres of upland and 40 acres of flats, with brick and wooden buildings, on line of New Bedford's new bridge, with most excellent water privileges.

This Company manufactures well known special metals in sheets and wire, yacht castings, brass, &c., and its celebrated horse bits, unexcelled in the world.

Present capacity about four or five tons of metal per day, which could be doubled easily by coupling up another set of rolls owned by the Company.

If desired the personal property, consisting of good-will, machinery, tools, patterns, process, &c., would be sold separately from real estate.

The opportunity is here presented for business men to acquire at a low figure an already established business of unparalleled merit.

The Horse Bit business will be continued, whatever disposition is made of the other property. Address

H. C. W. MOSHER,
 New Bedford, Mass.

Engines and Boilers.

Portable Horizontal Return Tubular 8-horse Boiler with Horizontal Engine complete, \$185.
 Horizontal Centre Crank Engine 15 horse, good order, \$95.

Horizontal Boiler and Engine, 75 horse, complete, \$450.

Single Cylinder, single Drum Hoisting Engine, nearly new, \$195.

Pressure Blowers.

No. 1 Root Improved Style, excellent order, \$110.

No. 3 " " " " " " \$225.

No. 7 " " " " " " \$850.

No. 4½ Baker, perfect order, little used, \$250.

All makes Blowers bought, sold, exchanged and repaired.

A. ASHER,

2d Floor, 109 Liberty St., New York.

Wanted Second-hand Machinery

Two Beaudry Hammers, one 50 lbs. and one 75 lbs. Beaudry or equally as good; no belve hammers will do. Also, Power Forging Presses 30 inches or more between housings, capable of working 2 in. square stock. Submit cuts and full description with prices. F. O. B. cars. Address

"T. E. M.," P. O. Box 1145.

New York City

HARDWARE BUSINESS FOR SALE.

Located in the growing and prosperous city of Newton, Mass. Established in 1883. Stock and fixtures. Inventory \$7,000. Will be sold at a bargain. Address

ALONZO R. WEED, Assignee, or
EDWIN L. HALEY,

70 Kilby St., Boston

Water Tube Boilers.

From 15 to 100 H. P. All self-contained, and are ready for steam on arrival, both stationary and marine work. Send for my illus. catalog.

EGBERT P. WATSON,

Elizabeth, N. J.

WANTED.

To purchase a second-hand foundry equipment. State condition, location and price. Address

A. C.,

Care *The Iron Age*, Fisher Building, Chicago, Ills.

FOR SALE.

AT A BARGAIN.

1 Second hand Corliss Engine, 14 in. x 42 in.

1 Blake Stone Crusher, 15 x 9 with screen.

1 Dean Duplex Steam Pump, 5 x 3¼ x 5.

1 Edison Diaphragm Pumps.

WM. FLINTOFF, Haverhill St., Boston.

FOR SALE.

The Following Machinery From Ore Concentrating Plant:

1 40 H.-P. Horizontal Engine.
 1 7 x 14 Krum Jaw Crusher.
 1 Buchanan Granulator.
 2 Magnetic Separator Wheels, complete.
 1 Duplex Worthington Pump 10 x 14 x 10.
 25 Pulley Wheels 22 Flcor Hangers.
 13 pieces 1½ in. to 3 in. shafting, 16 in. leather belt 40 ft. long, etc.

"FLA 47,"

Care *The Iron Age*, 117-119 South 4th St., Philadelphia.

FOR SALE.

Will sell or trade for good farm, nice clean stock of hardware and implements, with store, building and warehouse, 20 x 130; will either sell or rent building.

Have large territory and wealthy community. Call on or address

J. JACOBSON & SON,
 Stanhope, Iowa.

EXTRA GOOD BOILERS:

Four 70 H.P., one 80 H.P., Horizontal Return Tubular, modern Boilers, just inspected and insured for 100 pounds working pressure.

RELIABLE PUMPS:

Worthingtons, Deanes, Hall, Smith-Vaile, almost new, 6 in., 5 in., 4 in., and 3 in. discharge. Condition guaranteed.

WILLOW WAREHOUSING CO.,
 3d and Willow Sts., Phila., Pa.

WANTED.

A 100 K. W., 125 V., direct connected generating unit. Speed not over 275 R. P. M. Ideal engine preferred. Must be in A1 condition. Address

"H. C. B.,"

Care *The Iron Age*, New York.

HARDWARE STORE**FOR RENT.**

For rent the finest hardware store building in Freeport, Ill.; 24 x 112 feet, and four stories high. It is in the very best block in the city, and has been used for hardware for the last thirty-eight years. Has elevator, shelves, counters, also hardware boxes and drawers. A fine opportunity. Population, 15,000. Apply to

T. K. BEST, Freeport, Ill.

Agency Wanted.

Manufacturer having branch houses in New York and Chicago is desirous of securing a line to handle on commission, or to manufacture on royalty. Something in the line of light hardware preferred. Address

"CHICAGO AND NEW YORK,"

Care *The Iron Age*, 805 Fisher Bldg., Chicago.

Experienced Business Man.

with first-class references who has been active for many years as agent in high furnace products and well known to the trade throughout the German Empire solicits agencies for American Houses for the sale of Foundry Iron, Rolling Iron, Plates, and for Iron and Steel Tubes. Address "U. M. 3726," care of Rudolph Mosse, Halle an der Saale Germany.

FOR SALE.

Steel Furnaces,
 Buckstays,
 Floor Plates,
 Short Rail,
 Grate Bars,

From a Steel Mill.

WALSH'S SONS & CO.,

Newark, N. J.

FOR SALE.

Hardware Stock in city of 3000 in Eastern Iowa; fine brick building; plate glass front; splendid location. Will invoice about \$5000. Only one other stock in the city. This city is growing, and a new railroad will be built this summer. Fine country around. This stock will not be on the market long. The fixtures are new and the stock clean. We get good prices; no cutting. Write for fuller particulars Address "COUNTY SEAT," care *The Iron Age*, New York.

FOR IMMEDIATE DELIVERY.
Angles, Beams,
Channels, Plates,
Tees, Zees, Bars

5000 tons in stock. Moderate prices. Send for stock sheet and quotations.

STRUCTURAL DEPARTMENT,
ILLINOIS STEEL CO.,

Designers, Manufacturers and Erectors of Structural Iron Work, Dealers in Structural Materials.

50 Wabansia Ave., CHICAGO.

Scrap Wanted.
Light and Heavy Steel Cast Machinery,
STOVE PLATE.

Send full description of material with lowest cash price.
F. GREINER,
 406 Drexel Bldg., Phila., Pa.

FOR SALE.
20 New Steel Tanks.

Round and Square—Open Tops—All Sizes.

$\frac{1}{4}$ in. sides, 5 16 in. bottom, outlets, angle iron around top braced inside, tested, but never used. 3,000 to 18,000 gallons. Prices on application.

HENRY A. HITNER'S SONS,
 Gaul and Sergeant Sts., Philadelphia, Pa.

FOR SALE.
 300 tons first-class 60 lb. Steel
T Relayers, with Splices.
DALLETT & COMPANY,
PHILADELPHIA.

BEAMS, CHANNELS,
ANGLES, PLATES.

Eye Beams, from 4 ins. (7 $\frac{1}{2}$ lbs.), to 20 ins. (65 lbs.)
 Channels, from 4 ins. (5 $\frac{1}{2}$ lbs.), to 15 ins. (33 lbs.)
 Angles, from 1 $\frac{1}{4}$ ins. x 1 $\frac{1}{4}$ ins. x 3-16 in. to 6 ins. x 6 ins. x $\frac{1}{4}$ in.
 Angles, from 2 $\frac{1}{4}$ ins. x 2 ins. x 3-16 in. to 6 ins. x 4 ins. x $\frac{3}{8}$ in.
 Zee Bars, 8 ins., 4 ins. and 5 ins.
 Plates, 1 $\frac{1}{4}$ ins. and over

All material in 50-ft. lengths or cut to specified lengths if desired. Send for detail stock list.
 All material in stock, and will be shipped immediately on receipt of order.

Quotations subject to prior sale.

THE FOREST CITY STEEL & IRON CO.,
 Cleveland, O.

Wagon Tires,
STEEL OR IRON,
RD. EDGE OR SQUARE.
Angles Up To Four Inch.
LOGAN IRON & STEEL CO.,
BURNHAM, PA.
Buyers of Scrap for Cash.

FOR SALE.

4000 tons 56 lb. steel relaying rails with splice bars located in West Virginia.

1500 tons 60 lb. steel relaying rails with angle bars f.o.b. cars Chicago, East St. Louis or Kansas City.

Two miles 35 lb. steel relaying rails with splice bars, f.o.b. cars Boston.

Several locomotives, standard and narrow gauge.

ISAAC JOSEPH IRON CO.,
 Swift Building, Cincinnati, Ohio.

For Sale, Prompt Delivery.

500 tons Selected No. 1 Wrought Scrap. No reasonable offer refused.

M. SAMUEL & SONS,
 North 2d and Kent Ave.,
 Brooklyn, N. Y.

FOR SALE.
RELAYING RAILS, ETC.

750 tons 60 lb. Steel with Angle Bars.
 1000 tons 56 lbs. Steel with Angle Bars.
 90 tons 30 lbs. Steel with Fish Plates, Southern Delivery.
 New and second-hand Freight Cars.
MAY & SPALDING,
 32 Broadway, New York, and Atlanta, Ga.

FOR SALE
Relaying Rails.

140 tons 25-lb. Steel, with splices
 2000 tons 40-lb. Steel, with splices.
 100 tons 50-lb. Steel, with splices.
 1500 tons 56-lb. Steel, with angle-bars.
 Tidewater delivery.

THE STEEL RAIL SUPPLY CO.,
 100 Broadway, New York City.

Scrap Iron and Old Metals.

EDW. O. MILES & CO.,

278 to 298 Marietta St., Atlanta, Ga.

CORRESPONDENCE SOLICITED FROM
BUYERS AND SELLERS.

FOR SALE.

20 lb. Relaying Rails.
 30 lb. " "
 60 lb. " "
 65 lb. " "

DONALDSON & NEWTON,
 421 Chestnut street, Philadelphia, Pa.

WANTED.

Scrap Iron and Steel

Correspondence Solicited.

C. Botjer, 405 Newark St., Hoboken, N. J.

FOR SALE FROM STOCK.

EYE BEAMS, from 8 ins. to 20 ins.
CHANNELS from 1 $\frac{1}{4}$ ins. to 15 ins.
ANGLES, both even and uneven leg, from 1 in. to 6 ins.

FLATS, from 1 in. to 20 ins. in width. Will cut to specified length and sell either plain punched or riveted

BUILDING and STRUCTURAL IRON of all descriptions.

BELMONT IRON WORKS,
 23d and Washington Ave., Philadelphia, Pa.

E. BISSELL & CO.
 WHOLESALE

HARDWARE AUCTIONEERS,
 12 Murray St. and 15 Park Place, N. Y.

Sales held weekly for the trade. Consignments solicited. We refer to the leading manufacturers and importers.

Scrap Iron, Steel & Metals
New Jersey Iron & Metal Co.,
PATERSON, N. J.

Write us when you have Scrap to dispose of or want to buy.

Scrap Iron, Steel and
Iron Rails

bought and sold by

M. J. & M. BLAKE,

10th Ave. and 15th Street,

New York City

Telephone Call, 897 18th St.

JOHN LEONARD.

MICHAEL BLAKE.

JOHN LEONARD & CO.,
IRON AND STEEL SCRAP.

IRON AND STEEL RAILS, PIG IRON, ETC.
220 Broadway,

ST. PAUL BUILDING, NEW YORK.

TELEPHONE, 975 CORTLAND.

Correspondence Solicited.

The Morton B. Smith Co.,
243 FRONT ST., NEW YORK.

OLD METALS

of every description purchased for cash, also

SCRAP IRON and STEEL

In car load lots

Correspondence solicited.

FOR SALE.

300 tons of original 65 lb. relaying steel rails, present weight about 62 lbs.

RICHARDSON & COMPANY, Inc.,
 Pittsburgh, Pa.

W. H. Perry Co.,
Providence, R. I.,

BUYERS OF

SCRAP IRON
AND STEEL.
FOR SALE.

24 Cylinder Boilers, 12-42 in. diameter, 30 ft. long and 12-36 in. diameter, 30 ft. long wrought iron heads, suitable for stack; also two Narrow Gauge Baldwin Locomotives.

L. & R. WISTER & CO.,

672 Bullitt Bldg., Phila., Pa.

F. R. Phillips & Sons Co.,

302-3 Harrison Building, Philadelphia.

Steel Rails,
Melting Scrap, Etc.

I buy Iron and Metal Scrap and wish to hear from anybody having cotton ties, pipe, hoops, cast borings, wrought and steel turnings, boilers, cast scrap, etc. Also wrecks from fire, etc.

ROBERT M. CUNLIFFE,

1140-42 Washington Ave., Phila., Pa.

BERKSHIRE IRON YARD,

M. H. ROGERS, Owner.

Scrap Iron, Metals, Etc.

221-223-225 Housatonic Ave.,

BRIDGEPORT, CONN.

TELEPHONE

WANTED.

Double Seamer to take 25 in. work. State price. Address "SEAMER," care *The Iron Age*, Fisher Building, Chicago.

'WANTED' BROKER.

Responsible firm, handling Scrap Iron and Metals, desires connections with reliable broker, who can control business in those lines. Address "I. & M.," care *The Iron Age*, New York.

FOR SALE.—Good clean stock of hardware, stoves, bicycles, tin ware and paints, also good plumbing and tinsmith business in town of 7,000 inhabitants. Invoice about \$5,000. Cash or good paper. Ill health cause of selling. Stock can be reduced. 18 miles from Boston. Address "CLEAN STOCK," care *The Iron Age*, New York.

SITUATIONS WANTED.

Advertiser, representing a number of hardware and building specialties, with office in San Francisco and large acquaintance in those trades, desires additional lines for introduction on the Pacific Coast. Address "PACIFIC," care *The Iron Age*, New York.

R. S. ARMSTRONG & BRO.,

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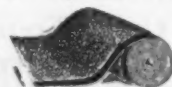
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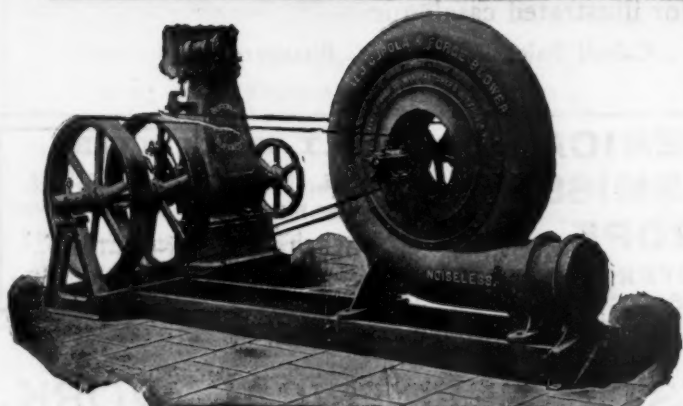
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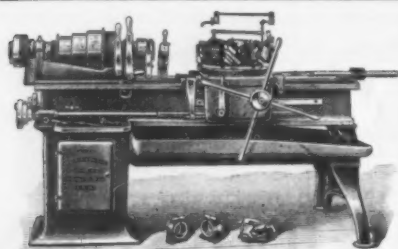
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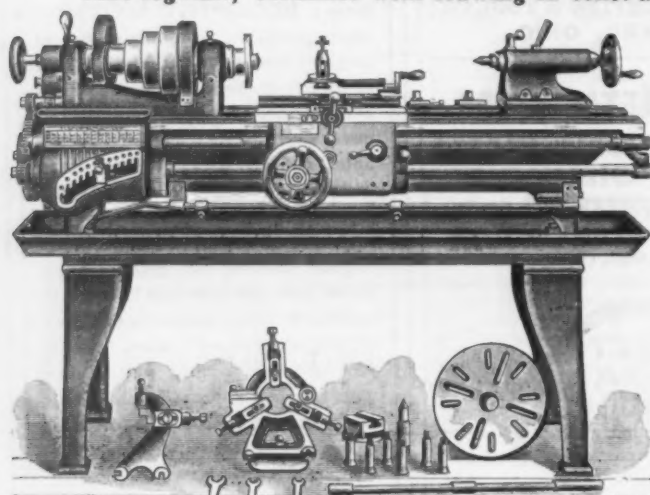
OR THE FOLLOWING

U. S. AGENTS:

Hill, Clarke & Co., Boston; Manning, Maxwell & Moore and The Garvin Machine Co., New York; J. W. Cregar, Philadelphia; U. Baird Machinery Co., Pittsburg; The E. A. Kinsey Co., Cincinnati; Manning, Maxwell & Moore, Chicago; Pacific Tool & Supply Co., San Francisco.

EUROPEAN AGENTS:

Schuchardt & Schutte, Berlin. Vienna, Brussels, Stockholm, St. Petersburg, Chas. Churchill & Co., Ltd., London, Birmingham. Adphe. Janssens, Paris. Stussi & Zweifel, Milan, Italy.



12 in. x 3 ft. Hendey-Norton.

THE IRON AGE.

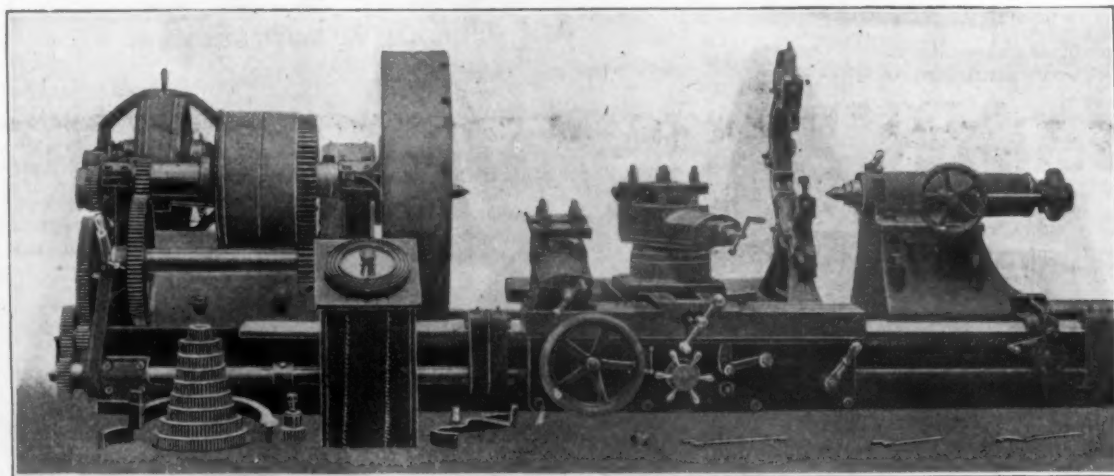
THURSDAY, MAY 31, 1900.

The American 52-inch Electrically Driven Engine Lathe.

The lathe here illustrated in front and rear views has been remodeled throughout and is now one of the heaviest and most rigid lathes of its size built. The head stock has been re-enforced to withstand all the strain that it is possible for the massive face plate (with extra heavy work clamped to it) to carry. The spindle is made of special crucible steel, accurately ground. It runs in phosphor bronze boxes that are scraped to true bearings. It is also provided with ball bearing end thrust collars. The front bearing is 10 inches in diameter and provided with a special device to insure perfect lubrication. The driving pulleys are 24 inches in diameter, with 6½-inch faces; they are bushed with phosphor bronze and run entirely independent of the main spindle, the power being transmitted through the gearing to the

can be clamped at any desired point. The cross feed screw has an adjustable nut for taking up wear or any lost motion. A new construction is introduced in the lateral feed rack pinion, which can be instantly withdrawn from the rack by a lever. The tail stock spindle is moved in and out by the hand wheel shown on the front slide. It is much more convenient than the old style having the wheel at the end. The center is extracted by the aid of an automatic knock out, when the spindle is in full, but when the spindle is extended the center may be extracted by the aid of a jam nut provided; the head is moved along the ways with a crank through multiple gearing. The center in the head stock spindle is extracted by the aid of a jam nut.

The rheostat can be placed in any desirable position for quick handling. The method of supporting the motor, on an extension of one of the head stock frames, is clearly shown in the second engraving. This lathe is



THE AMERICAN 52 INCH ELECTRICALLY DRIVEN ENGINE LATHE.

face plate, which is driven by an internal gear. The face plate is pressed on the end of the spindle by hydraulic pressure. The internal gear is a heavy cast iron ring, having teeth that are planed theoretically correct. This ring is forced into the body of the face plate under hydraulic pressure and securely bolted. The main driving pinion is phosphor bronze, the pinion that drives the internal gear being of steel. The ratio is 64 to 1.

The bed has the builders' patented drop V feature and is formed with double webbed walls connected by box girths at very short intervals to insure stiffness. The carriage is uncommonly heavy and has long bearings on the Vs. The compound rest is graduated to the full circle and has automatic feeds in all directions, including the cross feed on the carriage with the lateral feed of the carriage. The extra tool rest shown on the left hand end of the carriage admits of turning pieces of the full swing of the lathe. The apron extends the full length of the carriage, to which it is rigidly bolted. All the gearing within the apron is made of steel and all movements of the carriage are within instant and convenient reach of the workman. The lead screw is made of special steel and of large diameter, and is provided with supports along the ways of the bed to relieve it of all strain, and is furnished with gearing for cutting from ½ to 12 threads per inch. An automatic stop or cut off is provided by a sleeve, which slides on the lead screw and

built by the American Tool Works Company of Cincinnati. Its length is 33 feet and net weight 30,000 pounds.

Novel Location for a Pumping Station.

The Niagara Falls Water Works Company, allied to the Niagara Falls Power Company, have installed and have in operation two Riedler pumps, each of 6,000,000 gallons capacity. A novelty in connection with the installation is the fact that the pumps have been placed in a chamber excavated in the side of the big power wheel pit, nearly 150 feet under ground. This chamber is brick lined and the wheel pit is lighted with incandescent lamps.

One of the points that actuated the placing of the pumps in the wheel pit was the advantage such a location offered for the saving of fuel through the use of the available water power. Each pump is of the duplex, double acting type, having plungers 11½ inches in diameter by 30-inch stroke, and is driven by a 12-foot Pelton water wheel directly connected on the crank shaft. The pumps are so constructed that they will supply 3,000,000, 6,000,000, 9,000,000 or 12,000,000 gallons every 24 hours, against a pressure at the power plant floor of 70 pounds per square inch. The pumps will also furnish this service when working against a fire pressure at the engine room floor of 140 pounds per square inch.

The suction supply of water is taken from the upper Niagara River and passed through a filtration plant, and then down to the suction air chambers of the pump, situated in the chamber above referred to, 134 feet below the floors of the power house. From this point the pumps force the water back to the surface, the pressure in the vertical discharge leg being practically balanced at this point by the pressure on the drop leg of the suction pipe. The suction air chambers are necessarily made strong enough to stand the pressure of a working suction head due to 120 feet. To further guard against "water hammer" a special vertical air chamber is installed so that the suction water passes through it before entering the suction air chamber of the pump. A simple apparatus for permitting the regulation of the amount of air in all the chambers is provided.

The Pelton water wheels are 12 feet in diameter, and consist of an extra heavy fly wheel upon which are bolted the requisite number and size of water buckets. The wheel is inclosed in a flying steel casing. The water

number of the different fire alarm boxes and their location. Red stars indicate the boxes located in the territory supplied with water by the Niagara Falls Water Works Company, and when such a box is rung the pressure on the pumps is immediately increased. Over the indicator is an incandescent lamp covered with red glass, which flashes brightly when a box is rung. In a recent test for the benefit of city officials the pressure was increased from less than 100 pounds to 175 pounds in 82 seconds. This pressure at the pumps gives a pressure of 125 pounds on the mains of the city.

Ships for the Lakes.—In an interview given out recently, W. L. Brown of the American Shipbuilding Company presented some interesting figures bearing upon the new shipping that will be added this season to the lake fleet. Thus far this season to date the various lake yards of the American Company have launched 12 mammoth freight carrying steamers, including two 500-foot-

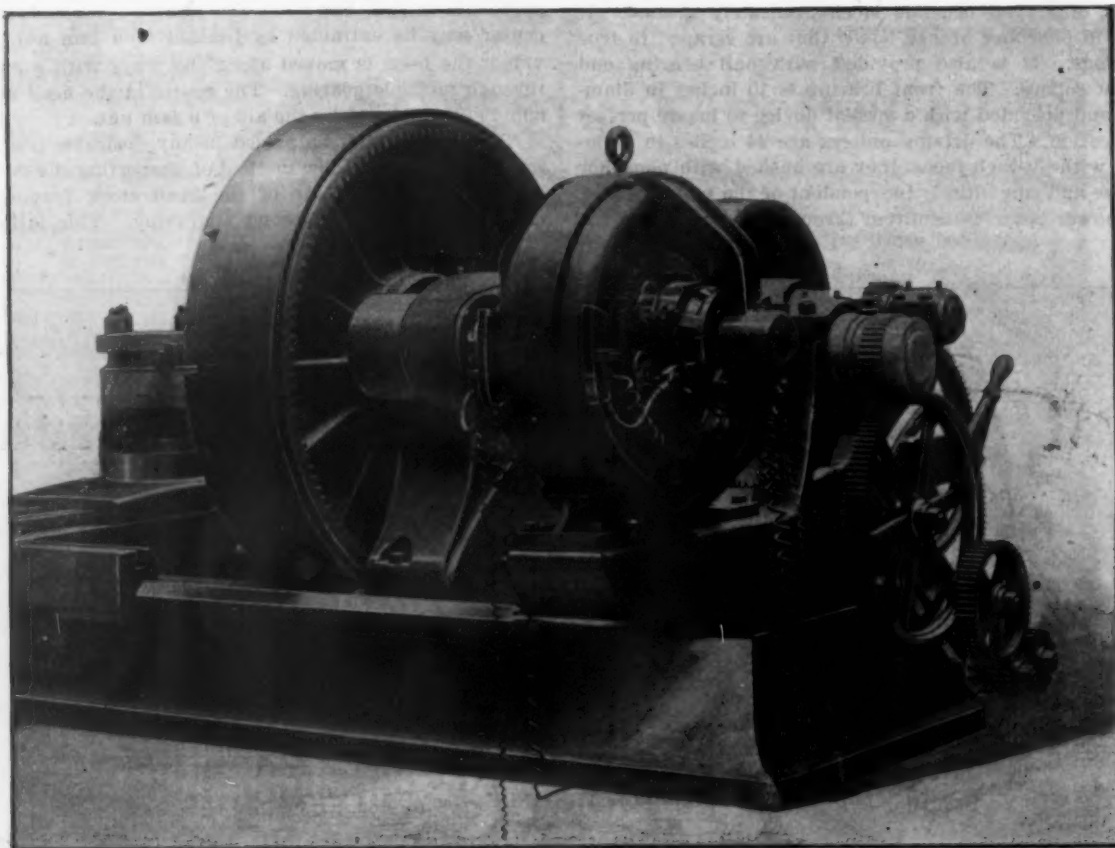


Fig. 2.—Rear View of Head Stock, Showing Position of Motor.

THE AMERICAN 53-INCH ELECTRICALLY DRIVEN ENGINE LATHE.

for developing power is taken and led through proper piping to the nozzles of the wheel. Three nozzles are provided, one being sufficient to develop the requisite power under normal conditions of pressure and two under extreme conditions, as the pumps are required to work both against normal and fire pressures of 70 and 140 pounds, respectively, and as it is desired to operate at all times with the least quantity of water possible to develop the power. The regulation is obtained from a special designed electro-hydraulic and speed governor. The operating switchboards are situated on the main floor of the power station, so that from this floor the regulation may be changed from normal pressure to fire pressure, or *vice versa*, as may be required.

The point in the wheel pit at which the water pumps are located is on the deck immediately over the power turbines. All who have been down in the Niagara wheel pit know what a terribly noisy place it is. It would be quite impossible to hear the sound of a fire gong down there, but a very effective device has been arranged to notify the engineers in charge when fire pressure is required. Near the pumps is a fire indicator, exactly like those in all modern fire houses of city departments. It is inclosed in a water proof box to protect it from dampness. At the side of the indicator is a board showing the

ers. These craft cost \$4,500,000, and their combined carrying capacity is 70,000 tons. There are now on the stocks in the yards of the company 11 more great craft, the combined carrying capacity of which is 60,000 tons; cost, \$4,000,000. Three of these are at the South Chicago yards, one at Cleveland, three at Lorain, two at Detroit, one at Bay City and one at West Superior. Here are 23 new craft, with carrying capacity of 130,000 tons, costing \$8,500,000. In lake shipyards outside of the American Company craft have been launched, or are almost ready, with capacity for 40,000 tons, making a total of new tonnage of the largest class of 170,000 and total valuation of about \$11,500,000.

In the returns of the twelfth decennial census soon to be taken Allegheny County, Pennsylvania, in which Pittsburgh is located, will be well at the head of the list of manufacturing and industrial centers in the United States. A great increase in the amount of invested capital will be shown, and the number of wage earners in the establishments throughout the county will be a decided gain over the enumeration of ten years ago. Anthony F. Keating will have control of the industrial census in the county. Mr. Keating will be assisted by a large corps of helpers.

THE IRON INDUSTRIES OF GERMANY.

EDITORIAL CORRESPONDENCE.

DORTMUND, May 5, 1900.—The triumphant march of Germany as an industrial nation has been the most striking economic phenomenon of the last quarter of the century. It is quite unparalleled in Europe and is rivaled only by our own achievements. The resources of the country are not remarkable for their magnitude and 25 years since Germany was poor. Against adverse natural conditions and with comparatively small capital, industries have been created whose power, once ignored, now inspires respect and in some quarters causes uneasiness bordering on dismay. The men who created such results, with modest means, seem destined, now that ample capital backs their energy and skill, to continue their conquering march with even greater strides. The qualities which have pushed them into the front rank are the important factors which are still operative and are now stimulated by success. The Germans are to-day unquestionably the leaders in certain lines of economic development which may or may not be the soundest and safest basis for future progress. The intervention of the State in many directions is a phase which at the first blush seems as though it unduly hampered individual initiative. The labor legislation, begun to head off socialistic agitation, imposes burdens which appear to be cheerfully borne on the whole, although there are indications that the paternalism may be carried too far. It is impossible to judge, coming from other surroundings, to what extent conditions justify and to what extent results will vindicate the measures taken. From the standpoint of a competitor they are factors to be taken into account, and are thus hastily touched upon to indicate what broad and complex questions meet him who endeavors in a brief period to grasp the situation and to obtain and convey some definite conclusions as to the capacity of the iron industry of Germany to maintain and expand its power.

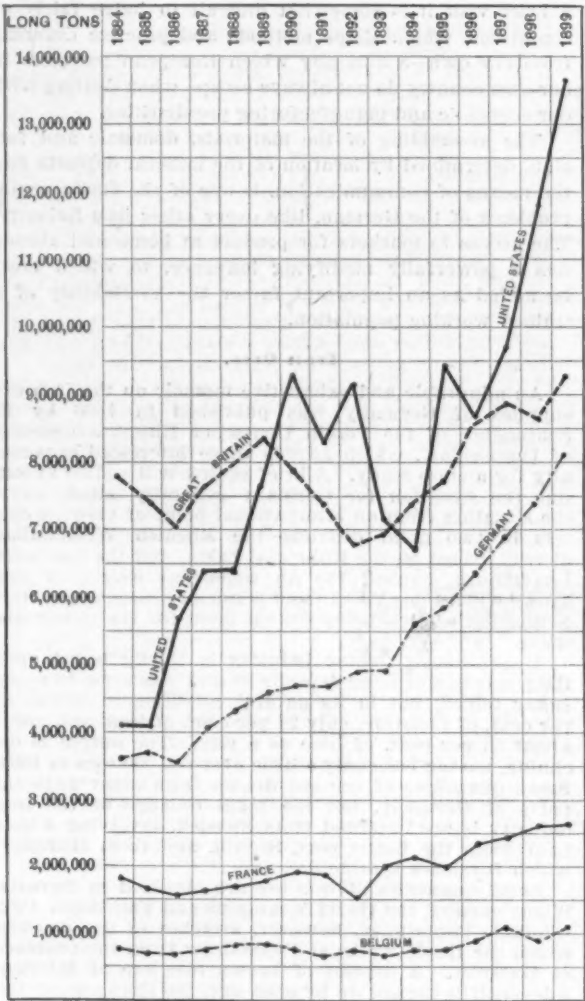
Until a few years since ours was a struggle for the mastery of our own home market, expanding with extraordinary rapidity and by leaps and bounds. During that period we watched Great Britain as the most important outside contributor to our markets, and the most dangerous producer should protection fall us. In the meantime Germany has steadily developed, and almost simultaneously with us looms up as a power in the world's markets. During the past three or four years of unexampled industrial activity her ironmasters have been under a tremendous strain to supply her own wants. But it may be doubted whether this growth of home consumption will last very much longer, and then, with her new capacity and equipment, she, too, will put a heavy pressure upon the world's markets.

We have become so much accustomed ourselves to a rapid development in output that we do not realize how exceptional is a record like ours. Yet when we contrast Germany's production of pig iron from year to year with that of our country, Great Britain, France and Belgium, the fact that Germany approaches our development will become manifest. An additional fact upon which the Germans pride themselves is that their growth has been practically uninterrupted, and therefore, they claim, inherently sound, while ours has been subject to violent fluctuations, which they regard as evidence of an economically dangerous situation, from the producers' point of view. The following table shows the production of pig iron in the five countries above named in each of the past 16 years:

Pig Iron Production in Five Countries.

Year.	Germany. Metric tons.	United States. Gross tons.	Great Britain. Gross tons.	France. Metric tons.	Belgium. Metric tons.
1884	3,600,612	4,097,868	7,811,727	1,871,537	750,812
1885	3,687,494	4,044,536	7,415,469	1,630,648	712,876
1886	3,528,656	5,888,329	7,006,754	1,516,574	701,677
1887	4,023,953	6,417,148	7,559,518	1,567,632	755,781
1888	4,337,421	6,489,738	7,968,969	1,683,349	826,850
1889	4,534,558	7,003,642	8,322,824	1,733,964	832,236
1890	4,658,451	9,302,703	7,904,314	1,982,106	787,826
1891	4,641,217	8,279,870	7,406,064	1,867,387	684,126
1892	4,937,461	9,157,000	6,706,355	2,037,258	753,268
1893	4,953,148	7,124,502	6,976,900	2,003,096	745,264
1894	5,559,322	6,657,388	7,437,342	2,077,647	818,597
1895	5,788,798	9,446,308	7,703,450	2,003,868	829,135
1896	6,360,982	8,623,127	8,563,200	2,339,537	959,414
1897	6,889,067	9,652,680	8,617,109	2,484,191	1,084,732
1898	7,402,717	11,773,984	8,631,151	2,534,427	979,755
1899	8,029,303	13,620,703	9,305,319	2,567,388	1,086,185

For the purpose of presenting a comparison of these figures in more striking form, the accompanying diagram has been plotted.



Comparison Production of Pig Iron.

THE IRON INDUSTRIES OF GERMANY.

Since 1887 the pig iron production of Germany has nearly doubled, while Great Britain has only last year added a new record, the former maximum production having occurred in 1882.

The German consumption has grown even faster, the

following table showing excess of imports (+) or excess of exports (—) and the apparent home consumption, disregarding stocks:

Home Consumption of Pig Iron in Germany.—Metric Tons.

Year.	Excess imports. (+)	Excess exports. (—)	Home consumption.
1884.....	.....	1,506	3,599,106
1885.....	.....	29,089	3,660,345
1886.....	.....	133,429	3,395,229
1887.....	.....	108,905	3,915,048
1888.....	51,715	.....	4,389,136
1889.....	164,586	.....	4,689,144
1890.....	246,858	.....	4,905,309
1891.....	79,025	.....	4,720,242
1892.....	37,956	.....	4,975,417
1893.....	55,545	.....	5,008,693
1894.....	.....	20,522	5,538,800
1895.....	.....	20,547	5,768,251
1896.....	144,263	.....	6,505,345
1897.....	332,090	.....	7,221,166
1898.....	135,417	.....	7,538,134
1899.....	440,599	.....	8,469,904

These figures may suffice as a proof that the German iron trade is entitled to justly claim a development during the past two decades second to none in Europe, and rivaling our own, when conditions are taken into consideration. Under the circumstances a general sketch of the economic and technical features of the industry of that country may be of service to the readers of *The Iron Age*. Naturally, broad lines only can be followed, but it is believed that there has been too common a tendency in our country to underrate the work achieved under somewhat trying circumstances. During a brief visit it is somewhat difficult to judge fairly of conditions which shape methods and practice differing from our own—a difficulty which European travelers in our own country do not always escape when dealing with our economic and manufacturing peculiarities.

The assembling of the materials, domestic and foreign, determined by location of the mineral deposits and the means of communication, is one of the fundamental problems of the German, like every other iron industry. The access to markets for product at home and abroad has a powerfully modifying influence, to which must be added as an important factor the availability of a trained working population.

Iron Ores.

An admirable and exhaustive memoir on the iron ore supplies of Germany was published in 1896 by E. Schroedter, of the Verein Deutscher Eisenhuettenleute, of Duesseldorf, which affords those interested opportunity for a close study. A brief sketch will suffice to outline the situation for Germany generally, since, as to the situation from an international point of view, it centers in two great districts—the Rhenish Westphalian district, based on the Ruhr coal basin, and the Lorraine-Luxemburg district, the all important source of ore. These will be described from personal observation, Herr Schroedter's work being drawn upon for the minor districts.

Upper Silesia, whose industry is chiefly based upon the possession of large deposits of coal, has some iron ore, easily mined, but in its natural condition it carries 35 per cent. of moisture, only 24 per cent. of iron, and needs about 35 per cent. of lime as a flux. The output is declining, having been only a little over 600,000 tons in 1894. Small quantities of ore are drawn from other adjacent parts of Germany, but the main reliance of the iron industry is ore imported from Sweden, involving a long haul from the Baltic port, Stettin, and from Hungary, which furnishes spathic ore.

Small quantities of iron ore are obtained in Bavaria, Wuerttemberg, the Hartz Mountains and Thuringia. Considerable importance, however, attaches to the deposits which the Ilse works at Peine draw from the province of Hanover. A deposit of brown iron ore at Buelten-Adenstedt is opened up by open cut, the thickness of the bed ranging from 6.5 to 41 feet. Two smaller deposits at Bodenstedt and at Doernten furnish further supplies, the character of the ore mixture being such that it is self fluxing. It makes an ideal basic Bessemer pig, which is produced at an exceptionally low cost, in spite of the fact that the fuel is hauled a comparatively long distance. Schroedter states that the cost of pig at the Peine works in 1894 was 27.78 marks per metric ton, or say \$6.75. According to basic practice in a modern plant, this should yield a billet costing a shade less than \$10 per ton. The concern develops very conservatively, the quantity of ore mined in 1894 having been about 360,000 tons.

Another deposit of local importance is that of Hueg-el, where an ocher ore, ranging from 15 to 100 feet thick, is mined to the extent of about 120,000 tons per annum to supply the Georgs Marien Huette at Osnabrueck.

Westphalia produces a modest quantity of blackband and some pyrites cinder.

More importance attaches to the iron ore deposits of the Siegen district, one of the oldest of Germany. The ore occurs in fissure veins in the Devonian formation, principally as carbonate or spathic ore, which carries considerable manganese and is low in phosphorus. It was in this district that manganiferous pig, or spiegel-eisen, was first made and where it is still largely produced. All excavation through tunnels has ceased, and deep shaft mining is general, the average depth of the shafts being 675 feet. The production of the district in 1894 was 1,584,923 metric tons, of which 1,437,627 tons was spathic. This ore is roasted in kilns with a slight admixture of fuel, losing about 30 per cent. in weight. It is believed by good authorities that the district has a long life before it, and that a gradual increase in output is likely. About two-thirds of the ore produced is smelted in local furnaces, the balance going to the Rhine district and Westphalia.

An additional quantity of a little less than 1,000,000 tons per annum is produced in the Dill and Lahn River and Upper Hessian districts, the principal sections being Dillenburg, Wellburg and Wetzlar. Some of the ores are quite rich, but the greater part are siliceous, and being distant from the furnaces, are difficult to market.

By far the most important source of supply of ore for the German iron industry is that of the Lorraine-Luxemburg district, which will be discussed in detail subsequently, since it is the basis of a tremendous modern development, both in Germany, in France and in Belgium, overshadowing in importance and interest any other movement in the European iron industry.

To a considerable extent German blast furnaces in certain sections will always be dependent upon foreign ores. This is notably true of the furnace plants of Upper Silesia, and to a large extent also of the Rhine district and of Westphalia.

It may be remarked incidentally that thus far Stettin on the Baltic is the only port where a furnace plant has been established in Germany to produce pig iron from imported ores and coal. There has been frequent talk of a similar undertaking at Hamburg, but nothing has come of it as yet. There is much that is tempting in the plan of assembling ore and coal at tidewater, coking at the furnace, and depending upon the back country to take the product, particularly if, as in Germany, the raw materials are free of duty, while the pig is protected.

For a series of years the production of iron ore in Germany and in Luxemburg and the imports and exports of iron ore have been as follows:

Iron Ore Movement in Germany.—Metric Tons.

Year.	Production.		Imports.	Exports.
	Germany.	Luxemburg.		
1885.....	6,509,379	2,648,400	853,006	1,771,157
1886.....	6,051,579	2,434,179	812,676	1,831,649
1887.....	6,701,305	2,649,711	1,036,217	1,744,551
1888.....	7,402,382	3,361,936	1,163,372	2,211,819
1889.....	7,831,509	3,170,619	1,234,788	2,179,562
1890.....	8,046,719	3,359,413	1,522,180	2,308,119
1891.....	7,555,461	3,102,060	1,408,025	1,984,427
1892.....	8,168,841	3,370,292	1,655,843	2,276,155
1893.....	8,105,595	3,351,998	1,573,302	2,353,398
1894.....	8,433,784	3,958,281	2,093,007	2,558,724
1895.....	8,436,523	3,913,077	.....	.....
1896.....	9,403,594	4,758,741	.....	.....
1897.....	10,116,969	5,349,010	3,185,644	3,230,391
1898.....	10,552,312	5,348,951	3,516,577	2,633,734
1899.....	11,975,272	6,014,393	.....	.....

So far as the production of iron is concerned, it may be noted that the principal Government mining districts contributed as follows:

Production of Iron Ore.—Metric Tons.

District.	1899.	1898.
Breslau (Silesia).....	476,823	473,462
Clausthal (Hanover).....	660,728	638,007
Bonn (Siegen, Dill and Lahn).....	2,735,019	2,529,200
Alsace-Lorraine.....	6,972,738	5,955,776
Luxemburg.....	6,014,394	5,348,951
Total Germany.....	17,980,665	15,901,263

Nearly the entire exports of iron ore from Germany are "minette" from the Lorraine and Luxemburg district, which is shipped to blast furnaces in France and in Belgium, ironmasters in both countries having control of deposits on the German side of the border.

The imports of iron ore, it will be observed, have grown very large, particularly when the fact is taken into consideration that they are much richer than the average of the product of the German ores. Schroedter has analyzed the returns for 1895 and presents the following as the chief items:

Iron Ore Importation 1895.—Metric Tons.

Country.	Tons.
Spain.....	608,227
Sweden (Dutch ports).....	464,056
Sweden (Baltic port).....	97,954
Algiers.....	129,460
France.....	39,628
Elba.....	26,556
Greece.....	11,610
Miscellaneous.....	19,881

For 1894 he estimates the receipts from sources not enumerated above as follows:

	Tons.
Belgium.....	118,000
Netherlands (bog ore).....	85,000
Austria-Hungary.....	115,000
Russia.....	31,000

Since these data were collected, however, it is well known that Sweden has become a particularly important source of supply for the German blast furnaces, since the phosphoric rich ores of that country are particularly valuable to the Germans for their basic Bessemer process. Your correspondent has met them as an important factor in the mixture of every blast furnace plant visited in the Rhenish province and Westphalia, while increasing quantities, too, have gone to Upper Silesia. The contracts made by German works with Swedish mines, in one case for 12 years, involve large and growing quantities, thus showing that important districts in Germany are becoming dependent to an increasing degree upon Sweden for its raw material.

To some extent the source of the iron ore imported into Germany is revealed by the official statistics, which, in the table below, cover the calendar years 1899 and 1898:

Source of Iron Ore Imports into Germany.—Metric Tons.

Country.	1899.	1898.
Free Port Hamburg.....	36,534	35,033
Belgium.....	126,649	126,824
Denmark.....	.....	980
France.....	70,137	60,979
Great Britain.....	30,055	15,388
Italy.....	.....	9,378
Netherlands.....	48,645	46,065
Norway.....	.....	440
Austria-Hungary.....	329,705	296,599
Russia.....	13,945	13,561
Sweden.....	1,476,743	1,446,842
Switzerland.....	.....	359
Spain.....	1,844,769	1,314,868
United States.....	.....	3,539
Total tons.....	4,135,372	3,516,577
Value, marks.....	64,563,000	54,484,000

Germany is, therefore, dependent to a marked degree upon foreign ores, which, generally speaking, are considerably richer than the native raw material. The ore imports from Austria-Hungary and from Russia go to the works of Upper Silesia, as does a considerable quantity of the Swedish ore. The latter has, however, found entrance into the mixture of nearly every furnace plant in Westphalia and the Rhine district, which, too, takes the bulk of the Spanish material. The ore from the Netherlands is bog ore, especially valuable for its phosphorus contents.

Germany exports ore also, the latest figures being those in the following table, showing the destination, minor countries being omitted:

Exports of Iron Ore from Germany.—Metric Tons.

Country.	1899.	1898.
Belgium.....	1,807,421	1,585,413
France.....	1,371,052	1,330,478
Austria-Hungary.....	33,787	24,416
Total exports.....	3,119,878	2,933,734
Value, marks.....	9,048,000	8,615,000

A comparison of the values between the ores imported and exported indicates their relative grade. As a matter of fact the ore exported to Belgium and France is the low grade minette, which is shipped to adjacent furnaces in France and Belgium from Lorraine and Luxemburg, the ore property being controlled in a number of cases by ironmasters in those countries. The ore probably does not go beyond 32 or 33 per cent. of iron. C. K.

The American Tin Plate Company have bought a large site of ground beside their tin plate works at Martin's Ferry, Ohio, and will erect a large number of new tin mills. The company will also erect a new tramway for bringing coal from the mines down to the present Laughlin works. It is the intention of the company to make this plant one of the most important tin plate works owned by the American Tin Plate Company. It is possible that the Irondale plant, at Irondale, Ohio, containing four mills, will be removed to Martin's Ferry.

It is reported that the Wheeling Steel & Iron Company of Wheeling, W. Va., will build a tube mill. They are large makers of skelp, which they now sell in the open market.

Mexican and Central American Notes.

CITY OF MEXICO, May 15, 1900.—There is great probability that one of the largest steel plant contracts ever let in Mexico will soon be placed with an American company, the Wellman-Seaver Engineering Company of Cleveland, Ohio. J. R. Morgan, who has been here for some time making contracts in Chihuahua and other sections for this company, has won golden opinions from those who can appreciate the methods of a thorough American gentleman in business transactions. One of our countrymen who has resided some time in Mexico said, when he heard that Mr. Morgan was returning to the United States, "That is the kind of men we need in this country; there are too few really refined Americans here to leaven up the whole mass and make the Mexicans respect us in business and other ways."

It is the Monterey iron and steel plant that Mr. Morgan has lately been making preliminary contracts for. There are several patents which the Wellman-Seaver Company control and which this \$10,000,000 plant at Monterey can hardly do without. The buildings are now in course of erection, and eventually the company will employ 5000 men at the works. To begin with, six open hearth steel furnaces will be erected, each of 50 tons capacity; also four 200-ton blast furnaces. Mr. Ferrara and other members of this Mexican corporation seemed to be greatly taken with the plant which Mr. Morgan's company are erecting at Hamilton, Canada, and it is probable that some of these gentlemen will visit the Cleveland works very shortly to thoroughly investigate the merits of the plants built by this concern.

There is also some probability of the building of a moderate sized steel plant in the City of Mexico before very long. In fact, ever since high prices have ruled in the American iron market there has been a steady investment of capital in this republic in iron and steel works, and before long, with the new mining sections which are opening up in Northern Mexico, a business of considerable value to the country will be built up.

The most celebrated of the iron deposits is that found in the State of Durango, usually known as El Cerro del Mercado. It has never been worked in a manner worthy of its vast extent, and the lowest calculation of the iron ore in sight is 100,000,000 tons. There are now two or three foreign companies studying Mercado, and we may soon hear of active operations on a huge scale in this district. Practically nothing has been done in iron mining up to the present, in this country; all the ore deposits in Chicapas, Oaxaca and Guerrero are lying idle, partly because the attention of investors has not been called to them, and also because the roads in that part of Mexico's iron district are in a bad condition.

Copper and silver mines are opening up in every direction. Of the latter the Rothschilds, through their representative here, have taken up 1400 claims in the Tasco (Guerrero) district alone. Messrs. Perry and Arthur are now opening up one of the old Spanish mines which were abandoned at the time of the revolution and which the records show were far from worked out. In the Sierra Madre it is common to find ledges with a width of from 50 to 300 feet, and it may be stated that such boddies seldom or never "peter out" in depth. There is such a vein at Sabrayacan west of Guerrero, the average yield in gold and silver being \$60 to \$80 a ton. A Pittsburgh firm will put in a \$30,000 electric plant for the American owners, but most of the heavy machinery will be shipped from El Paso.

At the copper properties of the Garduno Company, in Guerrero, a 16-stamp mill is now in operation and a ditch 3000 feet long has been cut through the solid rock. A number of prospects in this vicinity show from 20 to 45 per cent. copper, mostly in the shape of oxide and carbonate.

The surplus in the earnings of the Mexican Central Railroad has been used in substituting iron and stone bridges for wood all along the line. The increase in local traffic in 1899 was over \$2,000,000, and this year this amount may be further increased.

Sir Weatman Pearson, who has taken over the Tehuantepec Railroad, has also purchased the Alvarado line from that point to Vera Cruz. The advantages accruing from this purchase are that through travel for the isthmus of Tehuantepec can now avoid the sea trip from Vera Cruz to Coatzacoalcos, to say nothing of the dangers of yellow fever on the coast, which are always to be counted with, notwithstanding the contrary statements of interested parties. J. R. C.

The National Tube Company of Pittsburgh commenced last week dismantling their charcoal iron works at McKeesport, Pa., as well as the puddling furnaces. They are to make room for the enlargement of finishing mills. The charcoal iron department will be removed to Riverton, above McKeesport, where a structure twice the size of the works at McKeesport is being erected.

Railway Bearings.

An Investigation of Causes of Hot Boxes in Railway Service, and Methods for Their Prevention.*

BY ROBERT JOB, CHEMIST TO THE PHILADELPHIA & READING RAILWAY COMPANY, READING PA.

I take pleasure in presenting herewith results of an investigation to determine causes of hot boxes in railway service due to defects in the bearings themselves, and methods for their prevention.

It is a fact, well known to those who have made a study of bearing metals, that physical condition and structure exert a marked influence upon the efficiency of the metal in service. Formerly great stress was laid upon the general chemical composition of the alloy, and comparatively little attention was paid to the effects of the different conditions of foundry practice, or to the relation between structure and efficiency. The natural results followed, and "hot boxes" became prevalent in railway practice, especially so when weights and speeds became materially increased. Attention was thus directed to the production of cool running and durable bearings.

As a result of carefully conducted service tests the old copper-tin alloy of seven to one was found to be in-

made to show the general physical character of the composition, sections for microscopic examination were removed, polished, etched, magnified as far as necessary to show the structure to best advantage, and photographed. Analyses were also carried on at the same time, especially in cases where marked segregation of the metal was found to exist, in order to determine whether this result was due simply to an attempt at the foundry to form an alloy in proportions which were physically impracticable, or whether it was an effect of improper foundry manipulation. The marked crystallization which was often found in these bearings was also investigated in a similar manner. Also, in the majority of cases, test sections were cut from the bearings, and the tensile strength and elongation determined in order to find out whether in a given composition proper foundry practice would not be insured by placing a limit upon the strength and ductility of the alloy.

Side by side with these tests a considerable number of alloys have been prepared in the foundry to check the accuracy of the deductions and to secure information as to the conditions of foundry practice necessary to give the greatest strength and ductility to the given composition, the objects throughout the investigation being, first, to determine the sources of excessive friction inherent in bearings prepared under widely differing conditions of foundry practice, then to find out by experimentation the practice by which such defects were produced, as well as the methods and manipulation necessary to insure the most efficient results, in order to establish in

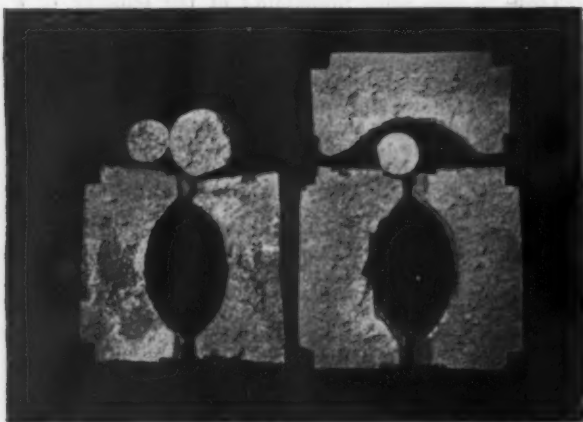


Fig. 1.—Fine Grained and Homogeneous.—P. & R. Ry. Standard.—Crystallized by Defective Foundry Practice (Copper-Tin-Lead Bearings).



Fig. 2.—Segregation.—Fine Grained, Homogeneous Bearing.—P. & R. Ry. Standard (Copper-Tin-Lead Bearings).

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ferior as a bearing metal, and the copper-tin-lead composition was gradually introduced, at first combined with phosphorus, and later with this element present in very small proportions, if at all, and then used only as a deoxidizing agent. Also the efficiency in antifrictional qualities of a copper-tin-lead composition, other things being equal, was shown by Dr. Dudley to increase with the proportion of lead which was present, the amount being limited, owing to the necessity of maintaining a strength sufficient to support the load, and also a fairly high melting point in order to prevent fusion and running from the box if heating resulted. In the best practice not more than 15 per cent. was present, owing partly to the above reasons, and partly to the inability at that time to satisfactorily combine a larger proportion.

During the past few years greatly increased attention has been paid to the microscopic study of the metals, and the importance of this method of investigation is becoming clearly recognized in view of the results which are being obtained through its use. In the course of an investigation to determine the alloy most efficient for general railway use, we found it desirable to follow up this structure of bearing metals in order to note the influence of this as well as that of chemical composition upon durability in service.

The Bearings Examined.

To secure information, a large number of bearings which had run hot and had been removed from cars of different railroads while passing over the Philadelphia & Reading Railway were taken for test. Fractures were

our foundries a thoroughly serviceable standard practice as free as possible from observed defects.

In the composition of the bearings a wide variation was naturally found, among others being the old copper-tin alloy of seven to one, and copper-zinc bearings running as high as 35 per cent. in zinc, an alloy which, by the way, had seldom been discarded owing to heating resulting from defects in the bearings themselves, but which showed evidence of exceedingly rapid wear; phosphor bronzes were found in moderate amount, while most numerous of all—probably because most used—were the copper-tin-lead compositions, varying in their proportions considerably, but averaging from 10 to 15 per cent. of tin, with from 15 to 5 per cent. of lead, the balance being principally copper. In the majority of cases, however, the mere general composition was found to have caused but small part of the difficulty. The main causes were the following:

1. Segregation of the metals.
2. Coarse crystalline structure.
3. Dross or oxidation products, and an excessive amount of inclosed gas in the metal.

In addition to these the lack of proper lubrication might be mentioned, though our investigation seems to show that a relatively small percentage of the bearings examined had been discarded owing solely to this cause.

Segregation.

Segregation has been found to be due in many cases to an attempt to alloy the metals in improper proportions, this being notably the case in some of the copper-tin-lead compositions in which an excessive proportion of lead had been introduced, with the ordinary practice, resulting in the liquidation of a portion of the lead, and often also the separation of a part of the copper into

* Paper read before Franklin Institute and published in the June number of the Journal of the Institute.

"copper spots," thereby producing surfaces of relatively high heating capacity, and ultimately causing "hot boxes." Fig. 3 represents a photomicrograph of a copper-tin-lead composition which had segregated owing to pouring too rapidly when at a high temperature. In this case a portion of the lead had separated out, and also a slight crystallization is seen, owing to the presence of a slight excess of silicon in the metal. Fig. 12 represents a bearing which had been badly segregated owing to rapid pouring, and had run hot in service. The composition was as follows: Copper, 74.67; tin, 15.27; lead, 10.27. Fig. 1 is a photograph showing upon one side the fracture of a badly segregated bearing with "copper spots," and upon the other that of a well mixed and homogeneous composition taken at random from our daily output, the segregation in the one case being due partly to the presence of an excessive amount of lead in the brass, but mainly to rapid pouring at high temperature.

To a certain extent these segregations may be prevented even in a wrongly proportioned alloy simply by rapid chilling of the metal immediately after pouring, as for instance by the use of a cold iron mold. Such practice is, however, at the expense of the ductility of the metal, and causes a marked increase in brittleness with consequent rapid wear in service. High heating, combined with rapid pouring and feeding, is, as mentioned, a very frequent cause of segregation, since under such conditions the metal in the mold remains for a con-

ever, it has been traced to the foundry practice, often being due to rapid pouring at high temperature. In Fig. 10 we represent the condition of a crystalline bearing which had run hot in service. Crystallization was also often caused, as will be shown later on, by the presence of an excess of various materials which were originally added as deoxidizing agents.

The effects of this coarse crystallization upon the durability of the bearing are twofold. In the first place, increased local friction results in the same manner as in the case of segregated bearings, owing to the varying degrees of hardness and heating capacity of the constituents, and secondly, the ductility of the metal and the tensile strength are materially decreased. As the rapidity of wear with a given tensile strength has been proved by different experimenters to increase with brittleness, it becomes evident that the durability of one of these crystallized bearings in service is bound to be defective owing to an excessive rate of wear, even though the heating which would naturally result should not occur.

Fig. 9 represents a segregated copper-tin alloy containing about 80 per cent. of copper and about 0.1 per cent. of phosphorus, showing the crystalline structure of such composition, and it may be mentioned in passing that the old copper-tin alloy of seven to one, having a somewhat similar structure, and formerly much used as a railway bearing metal, is a notoriously rapidly heating composition, and is not often found to-day used for this purpose. Fig. 2 is a photograph of one of these badly



Fig. 3.—Segregation; also Silicide Crystallization (Copper-Tin-Lead Bearing).

Fig. 4.—Crystallization Due to Phosphides (Copper-Tin-Lead Bearing).

Fig. 5.—Silicide Crystallization (Copper-Tin-Lead Bearing).

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siderable time in a molten condition, and by chilling gradually is given the greatest possible chance to solidify in definite natural alloys, throwing out whatever excess of metal may be present beyond these proportions, and thus resulting in segregation.

In actual service the effect of these segregations is readily understood, for it is evident that instead of an alloy of uniform hardness and heating capacity there is a mixture, some portions of which are relatively very hard, and others very soft, and this difference, combined with that occasioned by the varying heating capacity of the different portions, naturally localizes friction, and ultimately results in excessive heating. In a homogeneous alloy no such conditions exist, and although, as is true of some compositions, some of the metals may be present, at least in part, in mere mechanical mixture, and not as a definite alloy, yet the particles may be made so small that the friction throughout the bearing is practically uniform, and undue local heating is not liable to occur, excepting through some outside agency. A fine grained structure is obtained in these metals by means of comparatively slow pouring, the object being to have the metal in the mold remain in a fluid condition as short a time as possible, thus preventing any tendency toward segregation or settling out. Pouring at too slow a rate, on the other hand, tends to form "shot" in the bearing through the freezing of the metal before it has flowed completely into the mold. The proper rate of pouring can, however, be easily determined by careful experiment, and must be watched very closely in order to secure uniformly good results.

Crystalline Structure.

The coarsely crystalline structure which was often seen in these defective bearings was in some cases found to be due to the composition of the alloy, antimony especially tending in this direction. In many cases, how-

ever, it has been traced to the foundry practice, often being due to rapid pouring at high temperature. In Fig. 10 we represent the condition of a crystalline bearing which had run hot in service. Crystallization was also often caused, as will be shown later on, by the presence of an excess of various materials which were originally added as deoxidizing agents.

Dross or Oxidation Products.

Another very common source of difficulty found in defective bearings was the presence of particles of dross or oxidized metal mechanically inclosed, and also of large amounts of occluded gas in the metal. In the former case a hard, cutting surface was presented to the journal, causing increased friction, and hence heating. The presence of occluded gas in excess also tended in the same direction by reducing the actual bearing surface of the brass, and thus materially increasing the pressure. Such metal was naturally found to be very brittle, and to have worn rapidly in service. In the foundry practice the presence of this inclosed matter is as injurious as in the bearings themselves, tending to cause sluggish pouring, unless the metal is heated to a very high temperature, in which case crystallization and segregation—as shown above—are liable to result unless the speed of pouring is very carefully regulated. Lack of fluidity also tends to prevent the formation of sharp, clean castings.

Fig. 6 represent dross mechanically inclosed in a copper-tin-lead composition, and Figs. 7 and 8 show the appearance of the metal when containing an excess of occluded gas, and show clearly the loss of bearing surface which may result from such porous condition.

In ordinary practice the foundrymen, if left to their own devices, avoid sluggishness of the metal by simple heating until sufficient "life" has been given. If the metal does not contain any appreciable amount of dissolved gases or oxidation products, such practice is perfectly correct. Unfortunately, however, the bearing metals in general retain obstinately a considerable amount of gas, which is bound to cause sluggishness unless removed, and failure to effect this renders high heat-

ing necessary to give proper fluidity, and as in most foundries the piece work system is in vogue, the main object of the men is to empty the metal into the flasks in the shortest possible time. Thus we have two elements combined, high heating and rapid pouring, which, as has been explained, are almost certain forerunners of hot boxes, owing to the segregation which generally results.

Sluggishness can be entirely prevented with a minimum amount of heat by simply removing these dissolved gases and oxidation products from the metal, and this can be effected by the use of any good deoxidizing material. It is, for instance, a matter of common observation that when a small amount of phosphorus is introduced into a pot of molten metal a marked increase in fluidity results, and upon microscopic examination of castings made before and after the addition, the structure of the latter will be found much the denser, and, as a result of this, both strength and ductility will be found to have increased considerably. Phosphor bronze is, perhaps, the best known metal of this class, and is noted for its fluidity in the foundry and density of structure owing to thorough deoxidation of the metal.

Deoxidized Metal.

The wearing properties and strength of such metal have been found by different observers to be much greater than those of a metal of the same approximate composition but not deoxidized. Unfortunately, however, in the phosphor bronzes the attempt has been made

of these bases appears not to detract in any way from the antifrictional qualities of the bearing; they do, however, act to a marked extent as weakeners, decreasing both tensile strength or ability to carry loads, and elongation or wearing quality.

Effect of Brass.

In any large railway foundry considerable quantities of bearings discarded through one cause or another from cars of foreign roads are received in the scrap heap. Such bearings may contain a good deal of "yellow brass"—that is, metal containing a considerable proportion of zinc. If much of such brass is added to the pot a considerable proportion of zinc is introduced, and comparatively rapid wearing in service is certain to result. The best practice in such cases is, perhaps, to set aside such yellow bearings, and to add but one of them to a pot of metal, or just enough to correspond to the 1 to 2 per cent. of zinc desired, omitting then the addition of spelter entirely. By this means the good results of the deoxidation by means of the zinc may be obtained without retaining sufficient excess to produce brittleness. Zinc of itself does not, however, effect complete deoxidation, as may be shown by observing the increased fluidity in a pot of metal upon adding a small amount of silicon or phosphorus after deoxidation with the zinc, and noting the oxidation products which subsequently rise to the surface. The density of the metal also will be found, upon test, to have increased after the addition. In our own practice we prefer the use of silicon in very



Fig. 6.—Inclosed Dross (Copper-Tin-Lead Bearing).

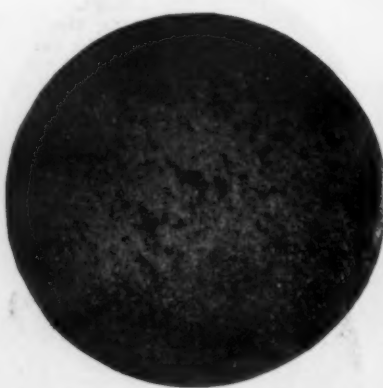


Fig. 7.—Inclosed Gas (Copper-Tin-Lead Bearing).

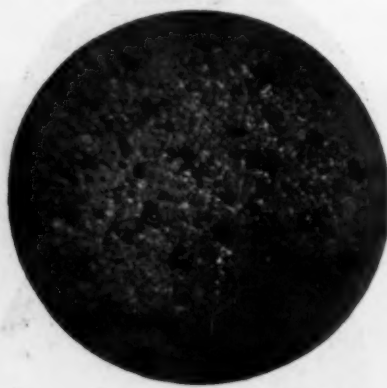


Fig. 8.—Inclosed Gas (Copper-Tin-Lead Bearing).

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to effect what may be termed "cumulative deoxidation," or, in other words, to store up deoxidizing material in the metal sufficient to remove oxidation products which may form upon subsequent remeltings. This effect, however, does not seem to result to appreciable extent, but, instead, a network of crystalline salts of the various metals is formed, and upon repeated remeltings this proportion of oxidation products gradually increases until, finally, the condition of the metal as a bearing is worse than if the deoxidation had never been attempted. Fig. 4 represents the structure of a bearing which contained an excess of phosphorus, and shows the appearance of structures which are often found, and renders evident why such excess should be carefully avoided in the most efficient bearing metal. Phosphorus has been mentioned in this connection simply as an exponent of a general class, but the same may be said of any other substance which combines with the bases present to form salts. Excess of silicon, for instance, results in the crystallization shown in Figs. 3 and 5.

Turning now to what may be termed basic deoxidizers, or metals like zinc or sodium, which combine readily under the conditions of the foundry with whatever oxidation products may be present in the metal. The action of zinc as an aid in producing sound castings has been long known, and in 1892 Dr. Dudley pointed out that not more than between 1 and 2 per cent. should be added to the molten metal, the reason of this being that sufficient oxygen and oxidation products are usually present to combine with the greatest part of that quantity, forming oxide of zinc, which rises to the surface or passes off as a fume, leaving but little of the metal itself to act as a weakener. The effect of metallic sodium in small amount is similar to that of zinc, excepting that the action is much more energetic, and hence but a very small quantity is required to effect the change. Excess

small proportion after the addition of zinc in the form of spelter, or as yellow brass. By this means a very strong close grained and ductile metal is obtained at a minimum cost. We find it necessary to regulate the amount of silicon very carefully in order to avoid the partial crystallization which, as has been shown, would otherwise result. It is easy, however, to determine the amount needed by experiment, adding a definite quantity of silicon to the melted metal after partial deoxidation with about 1 per cent. of zinc, stirring thoroughly, and pouring at once. A section is cut from a casting, and polished, etched and magnified. If an excess of silicon is present the crystalline appearance will be seen, as in Figs. 3 and 5. If this is the case, the amount of silicon should be reduced in the next batch, and a section again examined, this being continued until but a bare trace of silicon is found in excess, thus insuring almost entire absence of crystallization due to this cause. In our practice we have found that the amount of the deoxidizer required in the different lots of scrap is fairly uniform, and we therefore merely add to each pot the amount found necessary upon an average, checking up the quality by taking bearings at random from their daily output, a practice which we consider indispensable in maintaining efficiency among the workmen. Arsenic is sometimes used to effect deoxidation, but gives no better results than other deoxidizers, and should not be tolerated in the foundry on account of its poisonous properties.

The Effects Produced.

Turning now to the influence of the above mentioned defects upon the tensile strength and elongation of the bearings examined, dross or oxidation products are simply elements of weakness, and thus reduce both tensile strength and elongation. Coarse crystallization and segregation both tend in the same direction. With the

former, the faces of the crystals form the surfaces of least resistance, and thus facilitate fracture and lessen ductility, while in the segregated bearing the different portions of the metal vary in tensile strength and elongation, so that the section tears apart under a comparatively low stress. Excess of deoxidation also acts in a similar manner, and the result is especially marked in case of excess of zinc or of sodium, insuring comparatively rapid wear in service. A test section taken from the bearing represented by Fig. 4 showed a tensile strength of only 10,500 pounds per square inch, with an elongation of only 4 per cent. in a 2-inch section. A bearing of the same composition, if properly prepared in the foundry and free from crystallization, would have a tensile strength of about 25,000 pounds per square inch, and an elongation of about 13 per cent. when the test



Fig. 12.—Segregation Due to Rapid Pouring (Copper-Tin Lead Bearing).

meant an increased life to the bearings in service and a lessening of wear, our results in this respect being in accordance with the deductions given by Dr. Dudley in 1892 before the Franklin Institute. As an instance of difference in efficiency due to these causes, we may cite a service test in which eight bearings each, of two copper-tin-lead compositions, were placed under tenders of fast passenger locomotives, one bearing of each kind being placed upon an end of each axle. All the bearings were of practically the same composition, but the one set showed a tensile strength of about 16,500 pounds per square inch, with an elongation of about 6 per cent., while the other had a strength of about 24,000 pounds per square inch, with an elongation of about 13 per cent. This marked difference was due simply to the fact that in the one case the metal was porous, about as shown in Fig. 7, while the other was thoroughly deoxidized, and was close grained and homogeneous, similar in structure to Fig. 11. From time to time these bearings were removed and weighed, and the end wear measured. As a final result, it was found that the more brittle set had worn 35 per cent. more rapidly than the others. The results of similar tests, also, have been in line with the above. Therefore it becomes evident that increased ductility and strength in the bearing of given composition means, as stated, an increased life for the bearings in service, and, as relatively high ductility necessitates also freedom from the defects which we have mentioned, it is evident that the chances of cool running are proportionally greater. These qualities are therefore not merely of theoretical interest, but have an intensely practical value, and have a marked influence upon the success and economy of railway service.

Regarding the preparation of the sections for microscopic study, we have found it desirable to cut them from the center of the bearing, filing and polishing after the usual methods, and finally etching with an approximately decinormal solution of iodine in potassium iodide, the time of etching being usually about one minute. This etching gives very satisfactory results in many cases,

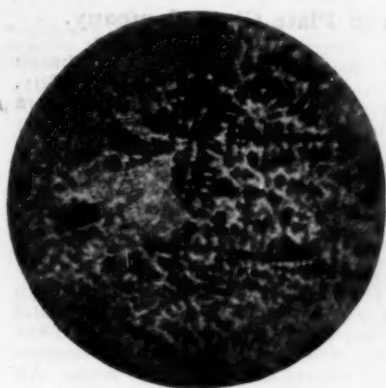


Fig. 9.—Segregation; also Phosphorus Crystallization (Copper, 80 per cent.; Tin, 19.97 per cent.; Phosphorus, 17 per cent.)

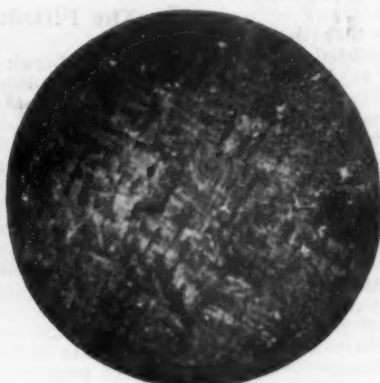


Fig. 10.—Crystallization (Copper-Tin Lead Bearing).

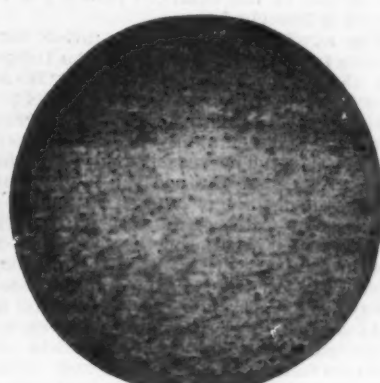


Fig. 11.—Close Grained and Homogeneous (Copper-Tin-Lead Bearing).

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sections were taken from the bearing in a similar manner.

In the porous brasses we naturally found the same lack of strength and ductility owing to the deficiency in the amount of metal present in a given section. For example, the bearing represented by Fig. 7 showed a tensile strength of 15,000 pounds per square inch, with an elongation of only 6 per cent. Fig. 8 showed a tensile strength of 18,700 pounds per square inch, with 7 per cent. elongation. Thus we see that the influence of the various defects is clearly shown when metal of a known composition is subjected to tensile tests, and it becomes possible to hold the foundry up to high grade of excellence by this comparatively simple means with analytical and microscopic work as a basis.

Objection may, perhaps, be made that it appears rather arbitrary to place limits upon tensile strength and elongation in bearings, and that, after all, in practical service it is merely necessary to have, with a proper composition, a fairly strong homogeneous material to obtain good results. In reply, we will merely state that as a result of very carefully conducted service tests made by placing bearings of practically the same composition, but differing widely in both tensile strength and elongation, upon opposite ends of the same axles, we have invariably found that increase of strength and ductility

though in some etching with dilute chromic or nitric acid has shown the structure to better advantage. In ordinary work we have found that magnification to about 30 diameters is sufficient.

French Coal and Iron Statistics.—United States Consul John C. Covert, at Lyons, France, has furnished the State Department with the official statistics of French coal and iron production in 1899, which show that the total production of coal last year was 32,933,780 tons, an increase of 577,684 tons over the previous year. The total pig iron production was 2,567,388 tons, an increase of 42,313 tons over the production in 1898. An increase over the preceding year of 76,345 tons was noted in the total production of rolled iron, the total in 1899 being 812,755 tons. The total production of worked steel for 1899 was 1,253,701 tons, being an increase of 79,626 tons over the total production in 1898.

The Schultz Bridge & Iron Company of Pittsburgh are erecting two large warehouses, 131 x 328 feet and 131 x 262 feet, respectively, at Progreso, Yucatan, using about 600 tons of structural material. The work is all manufactured at the plant of this concern at McKee's Rocks, Pittsburgh.

Steel Shipbuilding on the Lakes.

Such has been the degree of prosperity which has characterized the operations of the principal steel shipbuilding plants on the great lakes since last summer that it was generally supposed that any betterment of conditions would be impossible. The fallacy of this view has, however, lately been proven most conclusively. Although all the yards are well filled with work contracts have been closed within the past few weeks for six additional vessels, and there is now talk of a plan to get under way as soon as possible a full score of steel vessels. The animus for this sudden activity is found in the sudden realization by the moneyed lake vessel interests of the profits which await a moderate size steel vessel of a type and dimensions which will enable them to do service on the lakes during the summer season of navigation and go into the Atlantic trade during the winter. If the plan is carried out along the lines which have been fully mapped out within the past few weeks, coast shipbuilders and owners are likely to find in this direction a far more active competition than they had anticipated and one which cannot fail to exert some influence on commercial and steel shipbuilding conditions generally throughout the country.

It is the magnitude of the present project rather than the elementary idea of the project which is new. Readers of *The Iron Age* may remember that the field which was opened to just such vessels by the opening of the enlarged St. Lawrence canals late last fall was commented upon in these columns some months ago. At that time, however, it was supposed for the time being advantage would be taken of it only by the construction of steel vessels designed to carry grain direct from the head of the lakes to Montreal and possibly by the securing by lake shipbuilders of a few contracts which could not be handled in the overcrowded coast yards. Both these results have already followed—a whole fleet of vessels for the Montreal service has been contracted for and lake builders have already built two steamers for Porto Rican service—and now at the very opening of the first full season of the enlarged canals the more pretentious project is broached.

The newly organized corporation for which the vessels are to be built is known as the International Navigation Company, and the president is A. B. Wolvin of Duluth, who is the manager of the fleet of vessels owned by the interest affiliated with the American Steel & Wire Company and commonly accredited as the property of that company. The vessels will be of the maximum size to permit passage through the Welland and St. Lawrence canals—that is, about 250 feet in length—and on the maximum canal draft of 14 feet will carry 75,000 bushels of wheat. In ocean service they will carry about 1000 tons in excess of this. The vessels for which the contracts have already been closed include three steamers and three barges. The former will be fitted with quadruple expansion engines and Babcock & Wilcox boilers. In designing the ships the demands of both lake and ocean service had to be considered. The engines will be located amidships in order to satisfy the requirements of the coast underwriters, but in the arrangement of the hatches and almost all the essential characteristics they will be a compromise between lake and coast practice and will virtually constitute a new type of ship, which will interest naval architects and shipbuilders all over the world. Of course the most interesting phase of the subject is the intimation that a little later twenty or more of these vessels will be built by Mr. Wolvin and his associates, and that the six for which contracts have been placed represent but the preliminary move in what is certain to prove a very important enterprise and one for which the necessary capital is already assured. As has been explained, the new line of vessels will operate during the season of navigation between Duluth and Montreal, carrying freight to the ocean steamers at the latter point. Before the ice blocks the St. Lawrence the vessels will be on their way across the Atlantic with cargoes consigned direct to Europe, if paying freight can be secured. They will return and engage either in the Atlantic Coast or Gulf of Mexico trade. The contract for the new vessels has, of course, been placed with the American Shipbuilding Company, the combination of lake yards.

President W. L. Brown, in speaking of the matter recently, said: "We fairly assume that these boats will be the nucleus of a very much larger tonnage likely to be created on the lakes for salt water service." Mr. Brown takes the ground that while the vessels will, of course, be built to cross the Atlantic, the demand for them to a greater extent will be in the South American, Cuban and Porto Rican trade. The greatest care is to be taken that the stability of the vessels for both lake and ocean service shall be conclusively demonstrated; indeed drawings have been submitted to the representatives of the Bureau Veritas, and the vessels will have the

approval of that classification society before work is commenced. According to the present plans, contemplating a vessel 242 feet keel, 42 feet beam and 26 feet depth, the capacity on the lakes and canals will be 2400 tons and on the ocean 3500 tons.

Nor does this by any means represent the full scope of this new phase of the shipbuilding industry. The Bertram Engine Works of Toronto have the contract for several steel steamers and tow barges for the American-Canadian syndicate headed by W. J. Conners, which is to erect immense grain elevators at Montreal and develop the St. Lawrence route grain trade, while still other vessels for the same service will be contracted for later. A syndicate of Canadian capitalists has building abroad at the present time several vessels which will this summer enter the service of carrying ore from the Lake Superior ports to the blast furnace at Hamilton. The Steel Ship Building Company, who have started the equipment of a new plant at Collingwood, Ont., will also make a specialty of vessels of the same general type. Finally there are building at the lake yards a number of Welland Canal size steamers which, while contracted for especially with the idea of providing carriers for the iron ore consigned to blast furnaces like those at Tonawanda, N. Y., where there is not a sufficient draft of water to accommodate the large ships, could at the same time be put in the Montreal or even the Atlantic Coast trade on short notice and without inconvenience.

The work on the new freight carrying vessels under construction at the various plants on the lakes is progressing most satisfactorily. The Canada-Atlantic Transportation Company, operating a line of vessels between American and Canadian ports, have asked for bids for four 6000-ton vessels; the Ogdensburg Transit Company, of whom J. G. Westbrook of Ogdensburg, Ont., is general superintendent, propose to construct two steel steamers of Welland Canal size, and finally two railroad companies—the Ann Arbor and Pere Marquette lines—are figuring on new car ferries, so that it will be seen that the steel ship builders on fresh water are likely to have plenty of work to keep them busy for some time to come.

The Pittsburgh Plate Glass Company.

The Pittsburgh Plate Glass Company of Pittsburgh have just completed at their glass works at Ford City, Pa., one of the largest foundry and machine shops in the Pittsburgh district. The plant is said to have cost about \$250,000, and will enable the company to make all their machinery and patterns. It consists of a foundry, 68 x 200 feet; machine shop, 100 x 200 feet; pattern shop, 80 x 150 feet; blacksmith shop, 75 x 90 feet.

In the shops are installed two 10-ton electric cranes, two 10-ton cupolas, universal milling and gear cutters, 12-inch boring mills and 24-inch slotting machines, pipe machine to cut pipe from 2 to 12 inches, five blacksmith fires, one furnace for heating billets for crank shafts and heavy forgings, one set of bending rolls and one 1000-pound steam hammer. The company will also operate powerful punches and shears for structural work. All bridges and buildings needed will be built by the company's own workmen, and the Ford City plant will be operated to supply all the glass of the company. The punches will be able to cut holes from 1 to 3 inches in diameter, and the shears will cut any ordinary angle or plate. The idea in establishing the plant was to make the company as nearly independent as possible.

The new rail department at the Ohio works of the National Steel Company, Youngstown, Ohio, has been started up. The beginning was made on an order for 70-pound rails. The mill is constructed to roll any size rails, but the management states that nothing less than 60-pound rails will be rolled. It is arranged to roll sheet bars and rails alternately, and does not interfere with the output of billets. The rail department is under the supervision of John Smith.

At Pittsburgh the Fidelity Title & Trust Company, as executors of the estate of the late Horace Crosby, have filed an inventory. It shows the personal property of the deceased to be worth \$1,227,801.60. It is also shown that as second vice-president of the Tube Company Mr. Crosby drew a salary of \$25,000 a year. He owned \$371,000 worth of preferred stock in the National Tube Works Company and \$153,000 worth of common stock in it.

The American Steel & Wire Company have posted notices at their mills at Braddock and Rankin, in the Pittsburgh district, stating that hereafter the employees will be paid with checks instead of cash, as heretofore. The notice states that the checks should be honored for their full value, and in case they are not the fact should at once be reported to the company.

Silicon in Ferro-Silicon.—II

BY FRED. W. BAUER, JACKSON, O.

Since the publication of my first article on "Silicon in Ferro-Silicon" many contributions have been received containing views on the points brought out in the paper, and giving, in some cases, experiences when determining silicon existing in such a large percentage.

The conclusions which have been arrived at in these observations are two: 1. Fusion with Na_2CO_3 gives low results. 2. Treating with bromine and HCl gives high percentages of silicon. To be sure, in substance, when comparing the bromine method with the Na_2CO_3 method, the same idea is expressed in both conclusions, but the author wishes to use some figures to show that the former conclusion is the more important—i.e., that a method of using fusion with Na_2CO_3 always gives low results, and that the bromine method is not at variance with other methods. In support of this last statement the following six methods with the results obtained by each are given, and it may be added that the percentages obtained are the averages of a number of determinations using each method:

	Per cent. Si.
1. Direct fusion in sodium peroxide.....	16.25
2. Oxidation by bromine of HCl and final evaporation with silicon mixture.....	16.00
3. Oxidation by bromine in HCl	16.04
4. Continued boiling with aqua regia and final evaporation with silicon mixture.....	15.94
5. Direct fusion with sodium carbonate.....	15.66
6. Fusion with sodium carbonate of acid residues.....	15.17

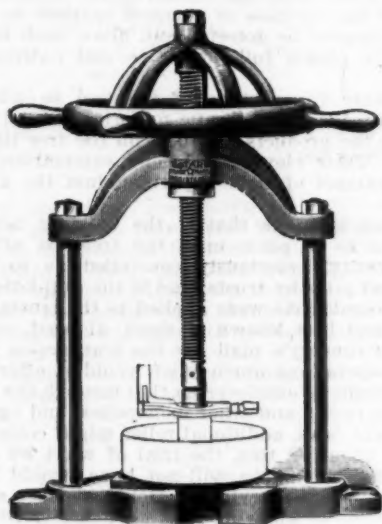
It will be seen that the results from the first four methods vary only 0.31 per cent., while the fifth method is 0.28 per cent. below No. 4, and the method using the fusion with Na_2CO_3 of residues from acid solutions is 0.77 per cent. below No. 4. A variation of 0.75 to 1 per cent. is not admissible in this grade of iron when results can be obtained by using other methods, which are more concordant than when using Na_2CO_3 fusion methods, and they should be adopted. Three different chemists, each using a different method, obtained the following results:

	Per cent. Si
Fusion with sodium peroxide.....	16.21
Bromine method.....	16.16
Aqua regia method.....	16.19

In no case did results obtained by fusion with sodium carbonate equal results obtained by other methods.

The Star Arbor Press.

The Star arbor press, manufactured by the Seneca Falls Mfg. Company of Seneca Falls, N. Y., is designed for forcing arbors into and out of work, and gears and collars on and off shafts. The screw motion, in combination with the ball bearing thrust, produces a tool easy to operate and of great power. The screw runs in a

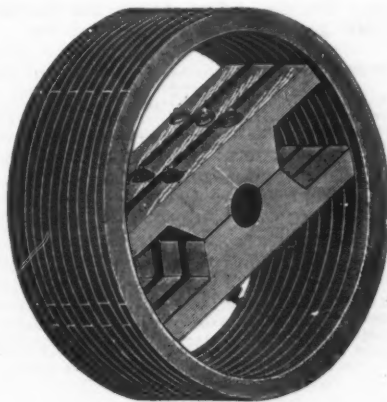


THE STAR ARBOR PRESS.

phosphor bronze nut. The work is supported by two hinged jaws, which are closed by springs. They can be opened to receive any size arbor and their edges are always pressed against the arbor and form a secure support for the work. The press is made in two sizes, one taking work 8 inches in diameter by 8 inches in height and the other 12 by 12 inches.

The Forster Wood Split Pulley.

In the wood split pulley which the Machinists' Supply Company of Rochester, N. Y., are placing on the market the arms are sectional and independent of each other. This feature permits of great clamping power, as each bolt is effective to its full strain. The arm is built up with the rim, thereby insuring ample strength at the union of the rim to the arms. The inner side of the rim



THE FORSTER WOOD SPLIT PULLEY.

is turned from the pulley's own center—namely, after the arms have been built in, thus producing a rim of uniform thickness and weight and of true balance.

Pacific Coast News.

SAN FRANCISCO, May 21, 1900.—The character of the year may now be considered as established for good. The first barley and the first wheat of the season have been marketed and the crop may be considered as beyond all risks of every description. During the ensuing month farming operations will start up in various sections of the State until everything is in full swing from one end of California to the other. It is a pity just now that prices of wheat and barley are so low, but the output in fruit and beets will help to make up for this to a great extent. Haying is proceeding all over the State. There will be a fair output, but prices, as in that of wheat and barley, are low. The wheat crop will bring in about \$20,000,000 at present prices; barley, \$7,500,000; fruit, \$40,000,000; beets, hay, wool and other farm products, \$20,000,000; lumber and minerals, \$31,000,000; so that our producers will have money enough with which to purchase largely of the products of home and Eastern industry. And Oregon and Washington will follow with their harvests of grain and fruit and of the forest and the sea. So that I predict for the coast as a whole a bright and prosperous year. Our business men in all lines should do well, and they all feel that they will do well. If the freight problem and the matter of differentials and postage stamp rates was settled, they would feel better. Here is where the East must protect the West.

The condition of business at present writing may be described as somewhat quiet, as it generally is at this time of the year. With the close of May there is, on the whole, a lull until cereals begin to come into the market. The low prices of wheat have interfered a good deal with the disposal of that cereal. Farmers have held off and there is a great deal now lying in the different warehouses of the State belonging to last year's crop, held over for a more favorable turn in the market. It is not very likely that this turn will come, and I expect to see a great deal of wheat got rid of so as to make way for the new crop. This will put a good deal of money into circulation, and although I would much rather have to look forward to almost anything else than low prices, still the sale of the balance of last year's crop even at low prices will be a good thing for everybody. And it thus may happen that the trade which usually does not come on until well into the fall may make its appearance considerably earlier. All of our houses are pretty well stocked with goods, and although a big demand is anticipated, they have no special need to buy at present. There have been large importations of agricultural implements for use during the coming harvest, and as the crop is large the needs of farmer and orchardist will be large, too. Our local manufacturers at Benicia, Stockton and elsewhere will have a good year, not only on account of the large crop, but that, as we have had large crops two

years in succession, the breadth of land sown to cereals will be very large this fall. It would be much larger than it will be but for the very low prices lately prevailing. The good crops in most sections make up to some extent for the low prices in some places. The crops have been the largest on record. The exports of agricultural implements this year have been much larger than for the same time in 1899. Some of those shipped have been in transit from the East.

The exports of articles manufactured from iron and steel have been very large this year so far, especially to the Hawaiian Islands. The totals for the first four months of 1900 have been as follows:

Agricultural implements.....	\$6,144
Bicycles.....	23,398
Instruments, scientific.....	45,890
Pig iron, 54 tons.....	1,732
Bar iron, 771,940 pounds.....	16,675
Steel rails, 690 tons.....	35,908
Sheet iron, 194,000 pounds.....	6,890
Sheet and plate steel, 670,584 pounds.....	21,775
Wire, barbed, &c., 2,450 pounds.....	95
Castings.....	201,400
Cutlery.....	1,491
Firearms.....	2,698
Locks.....	766
Saws.....	2,387
Tools.....	16,475
Cash register.....	50
Printing presses.....	702
Pumps and pumping machinery.....	107,431
Sewing machines.....	14,840
Boilers.....	63,659
Typewriters.....	2,468
Machinery.....	763,504
Nails, 4,793 kegs.....	15,565
Pipe, iron.....	164,126
Safes.....	5,070
Scales.....	2,827
Stoves.....	9,574
Hardware, various, not specified.....	73,767
Total.....	\$1,597,022

This shows a most conspicuous increase over 1899, in machinery especially. As far as the year has gone it shows an increase of about 50 per cent. over the year just noted, while in agricultural implements the total of the first four months equals three-fourths of the whole of last year. In agricultural implements intended for the Orient there is a great increase notable, too, and the "America Maru," which cleared on the 19th inst., had one shipment of plows valued at \$8000, intended for Japan. This is the largest shipment from this port in any direction that I remember as far as plows are concerned.

Imports by sea from Atlantic centers of trade have been large during the past two weeks. Four steamers had goods via Panama, the "Acapulco," the "San Blas," the "Newport," and the "San Juan." They had between them 18,836 packages of hardware, iron pipe, &c., hardware and pipe being especially strongly represented. The "Coptic" brought 3869 ingots of Straits tin, and the "America Maru" 968 ingots. The "Mareschal Suchet," from Liverpool, had 38,318 boxes of tin plate and 567 bundles of galvanized iron.

Thos. P. Smith, secretary of the Jobbers' and Manufacturers' Association of the Pacific Coast, has returned from a trip to attend the meeting of American manufacturers and represent the cause of the Pacific Coast. He was very successful in his efforts.

J. O. L.

Anti-Trust Legislation.

WASHINGTON, D. C., May 29, 1900.—There is a strong belief that within the next week the House will have passed one or both of the two measures recently reported from the Judiciary Committee for the regulation of so-called trusts. The Committee on Rules of the House has decided to make a favorable report upon a resolution which has been drafted by Chairman Ray of the Judiciary Committee setting aside June 1 and 2 for the consideration of the joint resolution proposing a Constitutional amendment giving Congress full power to regulate trusts, and the bill placing certain restrictions upon industrial corporations, both of which are now on the House calendar with favorable reports from committee.

A careful canvass of the House has been made by members of the Judiciary Committee and as a result it is stated that both measures will command a comfortable majority. Owing to the political questions involved and the impending Presidential and Congressional campaign, the vote on the two measures is likely to be cast on sharply drawn party lines. Certain Republicans, however, do not agree with their colleagues on all points, and an attempt is likely to be made to amend the bill. In this connection Representative Parker of New Jersey, one of the Republican members, has submitted a brief minority report, in which he takes sharp issue with his colleagues as to the advisability of one of the most important sections of the bill. His views will be read with

much interest for the reason that they are presented in defense of the leading industries of the country, which, he asserts, should not be assailed by legislation intended only to correct existing abuses. Mr. Parker says:

"The undersigned desires to express his entire agreement with the bill reported by the committee, except as to one section. Valuable amendments to the Sherman law are proposed, not only in increasing the penalties for its violation, but in extending them to officers and agents, extending the right of prosecution to those who are injured, and in protecting witnesses.

"The importance of the subject demands, however, that any legislation should strike at the evils of business and not at business itself. The terms of section 9 are too broad to be safe. When that section declares illegal any association or corporation engaged in production and 'carrying on business for the purpose of controlling or monopolizing the manufacture or production of any article of commerce,' the prohibition covers not only the unfair monopoly and unfair control that is obtained by unfair means, but also the fair control which a manufacturer, miner, or other producer may seek fairly, and perhaps obtain, by new machinery, processes and inventions; by his own trade secrets; by careful organization; or by ownership of natural facilities, such as mines or water power, or by other conditions which may give him success in his particular business and a practical control of the article that he produces.

"The prohibition as to production should be limited either to monopolies obtained by unfair means, or it should be directed to the unfair methods of sale, trade, transportation and commerce, by which it is claimed that certain unfair monopolies have been fostered and maintained. The claim is made that they have obtained special rates, special freight contracts, special privileges as to cars, storage, switching, telegraphy, prompt delivery of their goods; that without these privileges these great monopolies could not permanently exist and crowd out competition. These matters are already within the interstate commerce jurisdiction of the United States, and need to be reached by amendment of the Interstate Commerce law, which belongs to the committee on that subject, and over which the Committee on the Judiciary are, perhaps, not free to assume the jurisdiction that they would like to exercise.

"Much could be done by absolute publicity of all transportation contracts, and liberal provisions for *qui tam* civil actions for the recovery of unlawful rebates and suitable penalties from those who have obtained the benefit thereof. Meanwhile, it is to be hoped that the section in question may be amended.

"It is too important a measure to contain any provision that would attack any of the great productive energies of the country, rather than to prohibit the unfair business methods of sale, transportation and commerce that are used by some producers.

"It should contain provisions that will meet the evils, the boycotting of rivals or of those who deal with rivals, the rebates by common carriers, and the special privileges and rates; and that should make necessary such publicity of the business of common carriers as will enable these evils to be detected and allow each man who is injured to obtain full protection and redress in the courts."

In opposing the passage of the two so-called anti-trust measures the Democratic minority will advocate a bill placing the products of trusts on the free list of the tariff act. Their views are briefly summarized in the following extract of their report against the anti-trust measures:

"Our conclusion is that if the existing laws were amended so as to place upon the free list articles of prime necessity, notoriously controlled as to quality, quantity and price by trusts, and if the anti-lottery laws and fraud regulations were applied to the trusts, so that the worst and best known of them, at least, could not employ our country's mail for the transaction of their plundering operations, much relief would be afforded to a suffering people. We believe, too, that through the power to tax manufacturing and other monopolies, and by amending the patent laws, additional relief might come. If we are wrong about all this, the trial of what we suggest, but what the committee will not have, would be inexpensive and harmless, while it would at least afford us the satisfaction of knowing that we honestly tried to do something for the relief of our constituents. We might pursue the subject further, but we are content to leave this branch of it, with the hope that the candid man who would like to serve his country, and who is content to serve his party by serving his country, will believe that we surely do not suggest less for the public good than does the committee, with whose conclusions we do not agree."

W. L. C.

The Union Iron & Foundry Company, St. Louis, whose plant was practically destroyed by fire January

31, are actively engaged in completing new buildings. They expect to be melting iron in June. After the shops are in operation it is intended to greatly enlarge the power plant and install pneumatic hoists and appliances.

The Hilbert-Freiberg Power Post Hammer.

In the power post hammer made by the Hilbert-Freiberg Machine Company, Cincinnati, the stroke is adjusted by a screw and then locked in position by a nut on the end of the crank pin. The upper die is adjusted by a right and left sleeve held by lock nuts. The hammer head slide is 4 inches wide and 1 inch thick, scraped to a fit and provided with a phosphor bronze gib to take up wear.

The head is of cast steel, weighing 50 pounds. The anvil is of the same material, and of dimensions ample to



THE HILBERT-FREIBERG POWER POST HAMMER.

prevent breakage. The spring is elastic and yet sufficiently strong to transmit a powerful blow, and connected to the hammer by steel links. The bearings are lined with babbitt, the outer bearing having a turnbuckle which holds it rigidly in place. The brake acts promptly and positively. The pulley and brake wheel are keyed and set screwed to the shaft. The driving belt is run slack and controlled by an idler operated by means of a treadle and governing the strength of the blow. Exclusive of the dies the hammer weighs 735 pounds.

The Monarch Engine Governor.

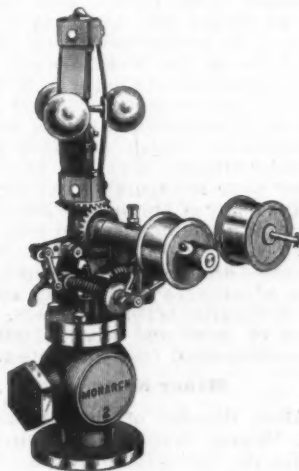
The governor here shown is designed for application to all types of engines. The throw of the valve may be adjusted independently of the radial throw of the governor balls without affecting the normal speed of the engine, so that for a given radial movement of the balls the valve throw may be made greater or less to suit the conditions resulting from the particular type of the engine, or from the peculiar circumstances under which the engine may be working. The automatic safety stop of the governor is positive in its action. This governor is manufactured by the Monarch Governor & Machine Company of Indianapolis, Ind.

Canadian News.

Cramp Ontario Steel Company.

Letters patent have been issued by the Ontario Government incorporating the Cramp Ontario Steel Company, Limited, with a capital stock of \$5,000,000 in shares of \$100 each. Among the incorporators are Chas. D. Cramp and Wm. M. Cramp, late of Wm. Cramp & Sons Shipbuilding Company of Philadelphia. This is the company of whose formation some notice was taken in these columns last winter in a paragraph about a project for iron and steel works in Collingwood. Every preliminary now seems completed, and there remains only the application of the powers and resources of the company to the building of the works. First, an agreement was entered into with the town of Collingwood, under which the company bound themselves to erect works of a given description in a specified time and to operate the same up to a defined limit and in observance of certain conditions. On its part the Town Council engaged that the municipality should give the company a cash bonus of \$115,000, a free site of 50 acres and exemption from taxation. This agreement was submitted to the ratepayers of the town and approved by them. Then application was made by the municipality to the Legislature for the special powers necessary to carry out such an agreement. These were granted in an act passed a few weeks ago. Next followed the company's petition for letters patent of incorporation. These have now been granted. Also, it seems, the necessary capital has been secured without difficulty, and is to come almost wholly from the United States. The way being thus made clear in every particular, it is announced that the work of construction will be begun this summer.

The plant is to be of the latest modern type, consisting of a blast furnace of 250 tons daily capacity, casting machines, three 30-ton open hearth furnaces, a blooming



THE MONARCH ENGINE GOVERNOR.

mill, and a large rolling mill. There will be one or two steel furnaces operated on the basic process, in order to treat, if necessary, the phosphoretic ores with the greatest advantage. In the steel rolling mill the equipment will be with a view to the turning out of steel rails, structural steel for buildings, bridges and shipbuilding purposes, and steel sheets. Nickel steel ingots and castings are included in the company's list of intended products. A five years' supply of first-class Ontario iron ore, it is said, has been secured. It is expected that a third of the steel output will be taken by the Collingwood Shipbuilding Company, whose works are being constructed, and of whom Captain Alexander McDougal of Duluth is the moving spirit. It is stated that the company have secured, or are negotiating to secure, 5000 acres of coal land in the coking district of Pennsylvania and West Virginia. Natural gas is to be prospected for about Collingwood, where a flow was struck years ago.

Agricultural Implements.

It has been decided by the manufacturers of agricultural implements in Canada not to make any exhibits at the fairs of the country this year. They consider the trouble is not fully repaid by any business returns from it. On the other hand, it is reported from some of the leading fair centers that applications for space have been received from all the leading manufacturers of farm implements in the United States. At the Western Fair,

which is held in London, Ontario, it is said there will be a great display of American implements. It is suspected that the managers of the fairs, resenting the boycott of the Canadian manufacturers of implements, have sent invitations to the rivals of these latter across the line. Certainly the American manufacturers will have quite an advantage in being the sole exhibitors. It was not supposed that Canadian manufacturers would readily let them have any advantage, for of late the question of American competition has been growing in gravity. Last year there was a very great expansion in the imports of American harvesters, mowers and other farm machinery into Ontario and the Northwest. During the present year the sale of American implements in these two great agricultural sections of Canada is reported to be larger than ever. It is known that the Canadian manufacturers would have been glad of an increase in their protection this last spring if the Government had dared to give it to them.

Canada Steel Company.

The Canada Steel Company, just incorporated by an act of the Dominion Parliament, elected directors at a meeting in Toronto some days ago. These are: E. A. C. Pew, president; F. E. Finckley, vice-president; and Messrs. Hardabeck, Butz and Young. Mr. Pew says the company are ready to go ahead at once, and mean to do so. The architects and engineers are E. M. Butz & Co., Pittsburgh. Work is to be begun, according to Mr. Pew's plans, next month, when he intends to have the corner stone laid with great ceremony. The ore for the furnace is expected to be brought from the West Hull mines, near Ottawa. The capital, like that for the Cramp Ontario Steel Company, will also, it is hoped, be furnished by people across the line. Mr. Pew's associates in the enterprise are Americans. The capital stock is \$18,000,000, and the works are to be constructed at Welland, on the Welland Canal.

To Consolidate Nickel Interests.

As now amended in the Private Bills Committee, the bill respecting the Nickel Steel Company of Canada permits the company to amalgamate with or acquire the shares or securities of the Nickel-Copper Company of Ontario and the Consolidated Copper & Nickel Company of Ontario. The Nickel Steel Company of Canada have a capital stock of \$20,000,000, and have a Dominion charter. The Consolidated Copper & Nickel Company are incorporated under Ontario laws and have a capital of \$5,000,000. They were incorporated two years ago. The Nickel-Copper Company of Ontario are likewise provincial creation, having been incorporated some months ago. Their capital stock is \$10,000,000. Some of the leading capitalists interested are in all the companies. Amalgamation would join advantages of Dominion corporate powers with those of Ontario corporate powers. Fusion, with the combination of these and other advantages, seems to have been contemplated from the outset.

Minor Notes.

Archibald Blue, director of the Ontario Bureau of Mines, was in Chicago last week to purchase another diamond drill for the use of the province. The purchase was rendered necessary by the great amount of mining development that is going on. The new drill is to be used in the eastern part of Ontario.

Several meetings of the joint committee appointed by the Kingston Council and the Kingston Board of Trade to negotiate with the parties who propose to erect an iron furnace in Kingston have been held. There seems to be a good prospect of the parties coming to an understanding.

Two diamond drills are to be started shortly by J. Kellendern of Milwaukee on iron ore beds in the rear of Kingston.

C. A. C. J.

The Clayton Air Compressor Works, 26 Cortlandt street, New York, have recently perfected a new type of duplex belt air compressor. These machines are built in small and intermediate sizes and embody all of the latest improvements. They have recently equipped five plants of the Brooklyn Heights Rapid Transit Company with compressors and pneumatic hoists; also the Grasselli Chemical Company, General Chemical Company, De La Vergne Refrigerating Machine Company, Union Brewing Company, Gill Machine Works, White Machine Shops, &c. Their export trade has more than doubled. They are shipping their product to England, Germany, Russia, France, Italy and Japan; orders also are being received from Mexico and South America.

The Keystone Car Wheel Company of Pittsburgh will apply for a charter on June 7. Among the incorporators are several persons who were formerly identified with the Pennsylvania Car Wheel Company, now absorbed by the Pressed Steel Car Company.

Lake Ore Matters.

DULUTH, MINN., May 27, 1900.—New ore ships are coming on fast and are adding to the total tonnage rapidly. Up to to-day the past three months have seen the launching on the lakes of 13 great freight carrying ships, the last of which was the "Harvard," of the Carnegie Steel Company, on Saturday. These 13 have cost about \$4,850,000 and have a capacity for 76,000 tons a trip. One 8000-ton ship will be launched for the Rockefeller Company early in June, one 6500-ton ship for Eddy Bros. about the same time, and eight others will follow, of a capacity for 50,000 tons and a cost of about \$3,000,000. These will all be in the ore trade at the earliest moment, and all of them are contracted for the season.

The American Mining Company have closed their Sauntry mine on the Mesaba range for the present. The mine's tonnage for the year was not to exceed 500,000 tons, and this can be sent out at any time, while certain preliminary work was to be done first. The same company are having difficulty with their Negaunee mine, Marquette range, where all work has been suspended for fear of a caving of the shafts and the possible ruin of the mine. In sinking the new shaft they encountered a body of water so large that their pumps could not cope with it. When the mine is filled they will be able to tell what the trouble is and will reopen. Some 500 men are laid off. The mine is shipping from its winter's stocks, which were large.

The Minnesota Iron Company's deal for lands in 50-14, leased by Hawkins, Wallace and others, from the St. Paul & Duluth road, and which was off a while, has been closed by the giving of a four months' option. This document is peculiar in that it turns over to D. H. Bacon of the Minnesota Iron Company 25-cent leases on the lands in question for \$3000 cash and further sums amounting to \$480,000; \$40,000 at the end of the option, four months hence, \$100,000 in a year, and the rest as a royalty of 4 cents a ton on a minimum of 200,000 tons a year. The entire \$480,000 is a royalty payment at that rate on 12,000,000 tons, which the lessees claim they can show. As yet they have not shown any such amount, of course, and their pay is to be proportionately on the amount of ore to be opened into. The total royalty to be paid, therefore, is about 30 cents a ton. Explorations in section 32, 58-20, before spoken of, have ceased with the deepest hole in the property bottomed in taconite at 465 feet, of which 428 feet is ore. This is one of the thickest ore beds on the Mesaba range.

By a decision of the State Supreme Court this week all the claimants to land in the famous "Section 30," near Ely, who had covered land originally entered by Eaton & Merritt in 1880 by half breed scrip, are wiped off and the title is held to be in Eaton & Merritt. This firm have not had ground to stand on in the case since 1883, when they were knocked out by courts. In so far as the present issue is concerned the decision is final, but there will doubtless be new hearings and the result cannot be foretold for years yet. The Eaton & Merritt locations are, perhaps, not the most valuable in the section, but they may be worth many millions. Who are back of Eaton & Merritt no one can surmise. It is reported that a very large body of hard hematite has been found near Tower by the Mahoning Ore & Steel Company. A shaft will be sunk.

Operations near Palmer, Marquette range, have been suspended till such time as a road can be built in. A very large body of lean ore has been shown up there. The old Norman exploration near Republic is to be reopened and developed with a view of selling it. Two miles north of the American mine, Pascoe, explorations are showing up what seems to be a lot of good Bessemer ore. They will be continued till the ore body is thoroughly explored. Labor has been so scarce on this range that many men have been brought in from outside, but now conditions are more favorable and men are growing plenty. Many of them are from saw mills that have been compelled to close on account of dry weather.

Crerar, Clinch & Co. of Chicago, owners of the Columbia, Mansfield and other Menominee properties, have taken the Voos, near Crystal Falls, and will develop it at once. They expect to ship a lot of the lean Bessemer, running 50 iron and 0.020 phosphorus, that is shown there, and will also explore the property thoroughly. The Armenia mine, on which Corrigan, McKinney & Co. have been preparing to work for some time, is now active, and will be developed for extensive mining another year. As soon as possible the mine will be unwatered. The Lotta exploration near Michigamme Mountain has been bottomed in good ore, but further work has ceased because of water. Chicago men are doing the work. The new dock of the Milwaukee road is to be ready for ore in July, which will make its construction one of the most rapid pieces of work ever done in the West.

The Minnesota Iron Company advanced the pay of their dock men at Two Harbors this week about 20 per

cent. There were 25 ore clearances there in the week, and 17 vessels are at the docks to-day. Ore is now going out at the rate of 600,000 tons per month from these docks.

A recent organization in the Northwest is the Iron Mountain Mining Company of South Dakota, to mine iron ore in the Black Hills, largely for flux for gold smelters. The company have just closed a contract with the American Smelting & Refining Company to supply at Omaha 100 tons per week, and expect later to furnish all the smelters will use, nearly 1000 tons a month. The company also intend to erect a paint mill and a smelter for Black Hills gold ores.

Present work and plans of lake copper mines in stamp mill building are record breaking, and are keeping machinery firms busy. Now it is stated that Adventure and Michigan mines may build a mill in common, at L'Anse. Isle Royale Company are sinking steel cylinders for their stamp foundations and completing excavations for the immense mill rapidly. Baltic Company have let contracts for foundations for their mill for \$40,000. This building will be 175 x 190 feet, and will contain ultimately four heads. The Nordberg Mfg. Company and the Wisconsin Bridge & Iron Works will equip and erect the mill. The Mass Company's mill will be ready within a year.

Quincy's new steel shaft house is being finished. This house covers a 4000-foot shaft, which was sunk in 18 months, and upon a parabolic curve. The shaft was attacked at several points where men could reach its course, both from the bottom and elsewhere toward the surface, and was driven both up and down. The engineering work on the curved shaft was notably accurate at all points, and the shaft is one of the most interesting features in an engineering point of view of this region, full as it is of interesting problems.

By the use of new processes the Carp Lake copper mine will be reopened. Though this mine contains a high percentage of copper it is so fine that saving it has been a problem unsolved. Now it is believed to be possible. Mohawkite, the new copper-nickel mineral, has been found in a second seam at the Mohawk mine. Like the first, it is a fissure vein, and presents great possibilities.

D. E. W.

Opening for Metal Workers in Philippines.

ILOILO, ISLE DE PANAY, P. I., March 14, 1900.—As it is a practical impossibility to get any sort of metal working operation done in this country, except in the crudely fitted shops of a few native machinists, and as there is a very great and largely increasing demand for work on machines which are being extensively introduced, it is evident that the time is not far off when the important cities and towns of the Philippines will offer good inducements for machinists and metal workers in general to locate. The writer arrived here last fall at a time when the warring factors were of such character that little attention was devoted to such peaceful pursuits as the operation of a machine shop or the erection of an industrial or manufacturing institution of any kind. The only kind of metals operated upon at the time were such as are employed in warfare. On the island of Panay there are several millions of people, and, being natives who lived in the crude fashion and without modern conveniences of any description, they managed to get along with only such metal working as was required in the carts used by them for transportation and in making weapons of war, such as blades for bolos and spears. Since the turn of the year, however, thousands of Americans and others from Europe, Spain and all sections of the world have come into the islands and taught the natives how to live according to modern and civilized ideas. The result is that the native, who formerly went without shoes, lightly clothed and lived in a shack, now requires all these things, and manufacturers are coming here with shoe machinery to make shoes to fill the demand, textile manufacturers are planning to put in machinery for making cloth to clothe the native, and building contractors are erecting buildings according to modern ideas.

With this great inflow of machinery for manufacturing purposes and metallic parts of buildings coming in on every steamer, the machinists' end continues neglected. In Iloilo, for example, there are only two crudely fitted machine shops for doing the work which ten modern shops ought to do. In Jaro there is one Chino who employs a gang of natives to work at metals in the most ancient way. In Molo two native machinists are struggling night and day with a few tools trying to keep about 10 per cent. of their customers supplied. At one shop there is work ahead for three months. There are plenty of ingenious natives and others who can take a hand at the machinists' work, but there are no tools. In one shop, where they are at it night and day, the only boring

ing tool is a device made about 200 years ago, of heavy hardwood beams, with a heavy system of wrought iron bars for turning and pressing down on the boring tool. Three men operate the affair, and spend 200 per cent. more time in boring an uneven hole 1 inch in diameter than is required on a modern boring machine. All the equipments are just the same. One file must do for the shop, and perhaps a dozen jobs are waiting for that file. The forges are all from 100 to 200 years old. Everything is heavy, crude and clumsy.

No Metal Working Tools in the Interior.

In January I accompanied a military expedition across the island, and at Oton, a place of 10,000 people, there was not a tool to be had to repair one of the escort wagons which had broken down. Up through Passi, Santa Barbara, Pototan and 30 or 40 other cities and towns of from 10,000 to 20,000 population each, the lack of machinists and machine shops and tools was noticeable. In fact, there are no tools worthy of the name on the island. It is a good thing that machinists' labor is cheap, being only about 25 cents per day for natives, so that the proprietor of the shop can afford to let a man work for a day or more boring a hole through a piece of metal or some other simple job which an American machinist could do in ten minutes on an American machine.

Some months ago an enterprising firm sent to Spain and other places for a great many one-horse carts and carriages for the use of the foreign element and such natives as care to pay for riding from place to place. The enterprise was a success until the teams began to break down and need repairing, without means at hand for doing the work. At Iloilo and other places I have seen dozens of these carts lined up waiting for a bolt to be made to replace a broken one or some other simple part. Often carriages must wait weeks before some simple part can be fixed. I have seen natives file out the thread on bolts for lack of taps and dies.

About a dozen printing offices have been established on the island since the practical ending of the troubles with the insurgents, and when a part of a press breaks, if the part cannot be tied up with wires or patched in some way, the press must stand for several weeks until a new part is obtained from the makers, for there is not ample machinery equipment here to make any important part of a printing press. Not long ago the only paper printed here was stopped for three weeks while procuring a plain cam from Hong Kong. There was not a tool in Iloilo or elsewhere, with which to do the turning. Some native worked two days and nights boring out and filing by hand a sort of cam, but it would not work as it was untrue.

The military authorities in every district compel natives of a certain age to wear pants and coat of white duck, and the demand upon local tailors for making these clothes has been enormous. As soon as it was seen that it would be impossible for the hand sewed garment workers to keep up with the call a steamer load of sewing machines was ordered from somewhere. Evidently the shippers of the machines saw a good opportunity to work off old patterns. Some of the machines which arrived here in that lot were fit for the junk pile. About 50 of them worked by hand, and some of them were made certainly during the first few years of the sewing machine. Only about 10 per cent. of the machines were good ones, and even these required some sort of tinkering to fix them and get them to run. In a very short time there was a great demand for machinists to fix the machines, for the local tailors bought every one of them at high prices and tried to get work out of them. I saw these machines tied up with strings and wires, and braced with wood blocks and put up in all sorts of ways. Soldiers who knew anything about the machinery trade could get a suit of clothes presented to them by helping the untrained native out by fixing up the machine so that it would sew. About half of the machines are now running and the other half are waiting for some American or other machine shop to open, and then the owners of the machines will pay any price to have their machines put into running shape. In some cases only a screw is lacking and in others the entire machine needs overhauling.

Trouble in Getting Repairs.

One of the most important institutions in Iloilo is the ice plant established by the Government for furnishing ice to the hospital and to some of the American troops on the island. I have seen the plant idle for days at a time because of the breakage of some part which, if there were properly fitted machine shops at hand, could be repaired in an hour. Sometimes a gear and again a shaft will give out and there is no way of effecting a repair for this important piece of machinery which supplies ice to the hospital, where many lives depend upon cold baths to ward off the fever.

At Santa Barbara, the former stronghold of the In-

surgent army, is a nice little narrow gauge road, with its equipment of cars all out of order and fast going to ruin because there is no way to keep the thing in running condition. The Spanish built the road, turned it over in good running shape, and as fast as some part of a car broke that car was sidetracked instead of repaired, and when any part of the track system gave out it was patched with nails, wires, &c., until in a year or two the whole thing became useless, simply because of lack of machinery with which to make a few bolts, plates or other fittings for cars and tracks.

Manufacturers of textiles have been here and the indications are that they will put in a plant for the weaving of duck and similar cloth for native wear. If this is so then the need of machine shops for keeping the machinery of the mill and the steam plant in order will be evident. Looms, cards, spinning and other machinery of cotton duck mills are always breaking down, and patchwork with strings and wires will not answer. At present there are several hundred looms of the Queen Anne pattern in use, all made about 300 or 400 years ago, on which as much cloth is woven on each per week as one of the Lowell looms will weave in one hour.

It is typical with everything Spanish to be in ruins. I think that for every sugar mill I have seen in operation I have seen ten idle simply because of the breaking down of some simple part. It does not seem strange to the owner to shut down his plant for three months while waiting for a part of the machinery outfit that could readily be made by any machinist with the proper tools in an hour. In some cases the sugar mills plant is operated by steam power, and in almost every instance the plant is shut down because of some breakage to the engine, and in some cases the plant is disconnected from the disabled engine and is operated by caribou power and a turnshaft.

Bridges Going to Pieces.

Spain in her prosperous days built about 350 good wood and iron bridges to cross the numerous rivers and small streams in the Isle of Panay. For about five years these bridges gave effective service, but as soon as a span weakened and broke, or some other important portion gave out through strain or wear, the natives failed to make the proper repair owing to lack of means with which to do the work, and consequently one in passing across the island finds that fully 75 per cent. of the bridges are out of service, and as the natives have never been in the habit of keeping things up, the only way to get across the river or stream is by ferry or by fording. On one expedition we crossed rivers by wading from ankle to armpit in depth 17 times in one trip of eight hours. There is no need of this, for in many instances the bridges were simply out of order at one end and could be repaired by a force of machinists in a few days at the cost of \$40 or \$50. Rather than replace a bolt in a bridge the average native would let the bridge go out of service, and he and his family would wade the river a dozen times a day.

In Iloilo, Molo, Jaro and Santa Barbara there are very excellent openings for machine shops of large proportions, but in the hundreds of other places of moderate size the little shops would be gold mines to the proprietors. It would not be necessary to put in heavy planing machinery, but what is wanted is steam power, drilling and turning machinery, a good supply of files, cold chisels, hammers, taps and dies, forge, &c. A good set of taps and dies would be worth their weight in gold here now. The only available set is in very bad condition and is in use 24 hours out of 24—that is, it is always in use and will soon be worn out. Bicycles are coming into use here and there are no means for repairing them. Typewriters, and, in fact, all the modern machinery of the age is being shipped into these markets, and the chances for machinists are daily improving. There is not a saw mill in island yet and all wood is sawed in boards by hand, but wood workers are here and planning for lumber mill outfits, and soon there will be saw mill machinery to repair.

MACHINIST.

James F. Fruit, Geo. Darr and William Flinn of Pittsburgh have secured an option on the controlling interest in the plant of the Sharon Water Works Company, Sharon, Pa., now held by R. D. Wood & Co. of Philadelphia. These capitalists represent a syndicate of Pittsburgh men who are heavily interested in the new steel plants being erected at South Sharon and in the new town being erected to accommodate the operatives. They recently secured a charter for the South Sharon Water Company, but in case they obtain control of the Sharon Water Company's plant they will simply extend the mains to South Sharon and Wheatland. The same syndicate also holds a charter for a street railway to extend from Sharon to Wheatland. The developments at South Sharon are probably the most important of any ever un-

dertaken in the Shenango Valley, extending to steam railroad building, water works, sewerage, electric light and power for mills and the public, electric railway and other large enterprises.

The Production of Basic Open Hearth Steel from Pig and Ore.*

BY AMBROSE MONELL, PITTSBURG, PA.

The process I am about to describe enables the manufacturer, if he desires to do so, to dispense with steel scrap, or to greatly reduce the percentage of scrap in his charge; and it enables the process with the use of pig and ore to be carried on as rapidly and economically, and with as great an output per furnace, as with a charge containing 50 per cent. of scrap.

The process consists in charging in a basic open hearth furnace limestone and a relatively large quantity of ore, heating these, and then charging molten pig metal taken from a mixer or direct from the blast furnace. The temperature of the resulting mixture must be sufficiently high to produce a rapid slag formation and yet low enough to insure the rapid oxidation of the phosphorus. The slag formed rises in a foam, and is drawn off at a cinder notch. One hour after charging the molten pig the bath is practically free from phosphorus, silicon and manganese, and the bulk of the slag containing the impurities has been removed. The bath is then in the best possible condition to be acted on by the flame and remaining ore which has not yet been reduced. The steel may be tapped when the carbon has reached the desired point. Either mill scale or tap cinder may be substituted for the ore, and the proportion of oxide may be varied according to the percentage of carbon desired in the finished product.

At the Homestead Steel Works of the Carnegie Steel Company two furnaces have been making steel by this process since February 18, 1900, the operation in detail being as follows:

A 40-ton basic furnace of the ordinary solid hearth type is employed, the inside dimensions being 12 feet 6 inches by 26 feet 4 inches, and the area of the checkers 4000 cubic feet. The stack has an outside diameter of 6 feet and a height of 140 feet 6 inches. A dolomite bottom is used, and the banks are made up of the same material.

A cinder notch at least 6 inches wide is cut in the back of the furnace, and the height of the notch is about 4 inches above the level of the bath when the furnace is first charged. A cinder pit, in which hooks are placed in the usual manner, is located at the back of the furnace, and as near as possible to the cinder notch—this arrangement of cinder notch and cinder pit being the only changes made in the furnace.

The first charge is 6500 pounds of limestone, which is distributed over the bottom, and then 22,000 pounds to 26,000 pounds of ore are added, depending on the silicon contents of the iron to be used. The ore employed is a red hematite from the Lake Superior region, having the following analysis: Metallic iron, 64 per cent.; phosphorus, 0.1 per cent.; silicon, 3.00 per cent.; manganese, 0.1 per cent. The ore and limestone are heated for about one hour and thirty minutes, at the end of which time the ore is on the verge of fusion but not necessarily fused.

The preliminary charge is now in a condition to receive the molten pig, which is obtained either from a mixer or direct from the blast furnace, the analysis of the pig being as follows: Carbon, 3.90 to 4.10 per cent.; phosphorus, 0.50 to 0.80 per cent.; silicon, 0.50 to 0.90 per cent.; manganese, 0.80 to 0.90 per cent.; sulphur, 0.04 to 0.07 per cent. Eighty-eight thousand pounds of metal are now brought in two ladles and charged in the furnace, the temperature of the metal being comparatively low—that is, not necessarily higher than when tapped from the blast furnace.

After making the above addition of metal, the reaction in the furnace is sharp, but not violent. The materials being at a comparatively low temperature, the phosphorus is oxidized with extreme rapidity, together with the silicon and manganese, and a portion of the carbon is at the same time oxidized. This is accompanied by a rapid production of basic slag. At the end of one hour, more or less, the phosphorus will have been substantially eliminated from the metal—that is, reduced to less than 0.04 per cent., together with the silicon and manganese. As the slag formed by these reactions boils up, it is allowed to run off through a cinder notch, located in the back of the furnace, and kept as near the level of the metal as practicable; the slag running into a pit in which hooks are placed and the slag is cooled and removed in the usual manner. The removal of the slag is finished within an hour from the introduction of the molten metal, and is preferably as complete as possible. In

* Abstract of paper read before the Iron and Steel Institute, London.

practice it will be desirable to remove about 80 per cent. of the entire body of the slag, leaving the bath of metal nearly uncovered.

At this time—i.e., one hour after adding molten metal—the slag which has been withdrawn and the metal show approximately the following analyses:

Slag.		Metal.	
	Per cent.		
SiO ₂	30	C.....	2.00-2.50 per cent.
Fe.....	30-35	P.....	0.04 or under.
P ₂ O.....	3-5	S.....	0.04 or under.
CaO.....	30-35	Si.....	Practically none.
		Mn.....	Practically none

By these operations the metal is dephosphorized while the metal is still at a relatively low temperature, which is the condition of temperature most favorable for that purpose, and the phosphorus and silicon bearing slag are removed from the furnace at an early stage of the process.

Although the metal is dephosphorized by the operation described above, and the phosphorus removed from the furnace when the slag is withdrawn, the decarbonization is not completed; that is, the carbon is not reduced below 2 per cent. when the slag is removed. The removal of the slag, however, leaves the surface of the metal nearly uncovered, and in the best condition to be rapidly heated by the flame.

The slag having been withdrawn, the bath is heated as rapidly as possible, the ore remaining in the furnace together with the action of the flame reducing the carbon with great rapidity. It is generally necessary to charge a few hundred pounds of ore just before tapping, in order to bring the carbon to the desired point, as the original ore charge is so estimated as to prevent the bath melting low. The carbon having been brought to the desired point, the operation is the same as in ordinary practice.

The following is a report by heats of a two weeks' run. The charge in every case was 6500 pounds of limestone and 22,000 to 26,000 pounds of ore or tap cinder, depending on silicon in the pig. The molten pig employed contained: Carbon, 3.80 to 4.10 per cent.; phosphorus, 0.5 to 0.8 per cent.; manganese, 0.80 to 0.90 per cent.

Record of Pig and Ore Heats.

Heat.	Pig iron.	Total product.	Product of total metal charged.	Time of heat.	Analysis of pig iron.		Ladle analysis.			
					H. M.	Si. S.	C.	P.	Mn.	S.
1....	88,400	91,510	102.8	9 50	72	0.028	23	0.017	34	0.025
2....	88,000	89,640	101.1	9 0	52	0.068	23	0.017	44	0.025
3....	86,400	90,610	103.8	8 10	40	0.050	19	0.017	40	0.023
4....	89,300	82,430	91.5	6 50	26	0.050	24	0.014	43	0.025
5....	88,400	94,810	106.2	9 50	55	0.086	23	0.015	40	0.028
6....	86,400	90,490	103.9	8 0	85	0.083	27	0.012	40	0.023
7....	87,000	91,640	104.6	7 40	60	0.050	25	0.016	40	0.025
8....	88,500	91,010	101.8	8 10	70	0.044	25	0.015	35	0.028
9....	88,600	90,240	100.5	6 50	65	0.034	27	0.017	40	0.022
10....	88,600	90,540	101.5	7 40	51	0.049	23	0.014	40	0.020
11....	90,500	93,010	101.9	7 30	53	0.068	28	0.016	40	0.023
12....	87,400	87,700	99.6	6 8	67	0.059	26	0.015	38	0.021
13....	88,500	91,540	102.7	6 5	68	0.050	29	0.016	38	0.024
14....	88,000	87,440	98.5	6 40	45	0.046	29	0.017	39	0.021
15....	86,500	82,150	94.1	6 20	68	0.050	28	0.011	45	0.021
16....	86,000	87,750	99.0	8 15	56	0.084	31	0.021	42	0.023
17....	87,800	91,360	103.2	8 35	72	0.024	15	0.015	40	0.024
18....	88,500	84,360	94.8	6 25	55	0.053	15	0.012	35	0.027

Number heats made during week..... 18
Product in tons..... 718
Product in per cent. metal charged..... 101.3
Average time per heat..... 7 hours 39 minutes.

Record of Pig and Ore Heats.

Heat.	Pig iron.	Total product.	Product of total metal charged.	Time of heat.	Analysis of pig iron.		Ladle analysis.			
					H. M.	Si. S.	C.	P.	Mn.	S.
1....	89,500	95,160	103.6	11 10	60	0.332	26	0.012	37	0.019
2....	90,400	93,810	103.0	8 30	63	0.043	26	0.017	40	0.021
3....	87,400	89,240	101.1	7 55	55	0.037	24	0.015	37	0.020
4....	88,900	96,910	104.9	7 45	57	0.040	26	0.011	35	0.020
5....	88,900	91,610	102.0	9 00	60	0.033	26	0.017	42	0.026
6....	87,500	93,710	106.3	8 50	46	0.049	26	0.020	39	0.024
7....	93,900	97,360	102.9	7 55	41	0.050	24	0.017	36	0.020
8....	91,100	94,610	103.0	6 55	50	0.059	27	0.012	36	0.023
9....	85,600	92,960	107.8	7 10	60	0.025	23	0.011	37	0.021
10....	87,600	94,960	107.6	8 20	40	0.042	24	0.017	35	0.021
11....	87,900	91,540	103.2	8 15	50	0.019	26	0.017	35	0.018
12....	90,500	93,410	99.2	8 3	38	0.074	24	0.011	35	0.019
13....	88,300	91,440	102.8	9 5	65	0.059	24	0.017	37	0.021
14....	88,560	87,940	98.6	9 5	92	0.024	26	0.015	43	0.027
15....	88,300	87,170	98.1	7 40	63	0.045	22	0.014	43	0.026

Number heats made during week..... 16
Product in tons..... 662
Product in per cent. metal charged..... 103.1
Average time per heat..... 8 hours 30 minutes.

It will be seen that 34 heats were made during the two consecutive weeks' run, the average time of a heat being eight hours, and the steel produced 1380 tons. There is also a material gain in product due to the iron reduced from the ore.

The chemical composition of the metal that has been used in this process has varied in carbon, phosphorus, silicon and sulphur, while the manganese has remained practically constant. With the pig employed thus far,

the only constituent a variation in which seems to affect the time of the heat is the silicon, in general, the best results being obtained with silicon running 0.60 and under.

The important factors in this process are:

1. The proportion of iron oxide charged must be sufficient to dephosphorize the pig at an early stage in the process, and the amount of limestone must be sufficient to form a heavily basic slag in order to hold the eliminated phosphorus.

2. The temperature of the mixture after the addition of the molten metal, which must be low enough to allow of the complete oxidation of the phosphorus and the silicon, and high enough to produce a sharp reaction and a rapid slag formation.

3. The removal of the major portion of the slag from the furnace at an early period in the heat, thereby increasing the action of the flame on the bath, and also preventing the possibility of the phosphorus returning into the metal.

In reference to the temperature of the hot metal used in this process, it would appear that the temperature of the metal itself is not the important factor, but the temperature of the mixture after the addition of the molten metal to the ore and limestone. As has been mentioned, the ore and limestone are heated for about an hour and a half before adding the molten metal, and under these conditions satisfactory results can be obtained with metal at a comparatively low temperature. If, however, the metal were previously heated to a high temperature in a suitable mixer, it might be possible to dispense with the preliminary heating of the ore and limestone.

The advantages of this process are as follows:

1. The use of scrap may be discontinued, if deemed advisable, and steel produced from pig and ore without either a decrease in tonnage or an increased cost.

2. It is possible in an ordinary basic open hearth furnace equipped to receive the molten pig to produce from pig and ore, with less fuel, as large a tonnage as from pig and scrap.

3. In a plant already equipped to handle molten pig, the operation of charging a furnace is both shortened and cheapened.

4. By practically removing the phosphorus from the pig while the carbon is still 2 per cent. or more, it is possible, without reducing the output, to produce a low phosphorus steel of any desired carbon from either a high or low phosphorus pig.

Central Pennsylvania News.

HARRISBURG, PA., May 21, 1900.—“A great deal of business is in the market,” said the purchasing agent of one of the large steel concerns of this district, “but until the public has been convinced that the bottom is not going to drop out of the present situation there will be more or less suspension of orders.” The various plants in this territory are all running more or less regularly, and most of them on full time. Many orders are being held back in the hope that the prices will reach a lower level, but there is no disposition on the part of the manufacturers here to rush into the cutting business. In some respects it is a waiting period, and to that extent trying upon the nerves of manufacturers and customers, but it is generally believed that the time is not far distant when a mutually satisfactory adjustment will be reached and business will proceed with a rush because of the postponement.

The pipe trade is not so active in some lines as it was a few months ago, but the two plants in this immediate section are in operation and look confidently to the future. It is owing to the holding up of the pipe trade that the skelp mill of the Susquehanna Iron & Steel Company, at Columbia, has been idle.

Some good foreign orders for rails have recently been booked by the Pennsylvania Steel Company, and the outlook at that plant could hardly be better. For the last week the output was above the average in every department. Additional orders have been booked by the bridge and construction department, which has been very much crowded for several months. The same statement applies to the frog, switch and signal department.

There has been little change at the other plants in this section since last week. The Lalanc-Grosjean Mfg. Company, says General Manager Stanford, have sufficient orders to keep the mills running full time the rest of the year.

The works of the Harrisburg Boiler & Mfg. Company are in full operation with plenty of orders, and the Harrisburg Car Foundry & Machine Works are also in good shape for the season.

Many thousands of dollars have been invested in betterments by the various steel and iron plants in this territory during the past year, and the capacity of a number of them has been greatly increased. Under these conditions a much larger business can be accommodated.

MAY 28, 1900.—Certain plants have felt the cessation of orders to some extent, but there has not been the wholesale shutting down of mills and furnaces which one might have expected from the pessimistic reports published in a few newspapers. As a matter of fact, until very recently every plant in this district has been running full in every department and the conditions now are fine as compared with two or three years ago.

Of the Pennsylvania Steel Works at Steelton it may be said that the departments have all been very busy during the past week and have all turned out large products. Work has not yet been commenced on the large office building and the construction of the building may be deferred until a little later. Plans have been made and proposals have been invited. It will cost about \$100,000.

The American Car & Foundry Company have formally canceled their option on a large tract of land adjoining the Pennsylvania Steel Company's property.

The Harrisburg Pipe & Pipe Bending Company are fairly well supplied with orders except the new pipe mill, which will not be in operation until next month. An order has just been placed with the company for 32 large copper coils by the E. P. Allis Company of Milwaukee. These coils are to be used in the construction of the new power plant for the Metropolitan Traction Company of New York.

The South Harrisburg Chain Works are running four days a week. Fortunately the management stocked up with rod iron at a reasonable price and are not hampered with high price materials on a declining market.

The Harrisburg Rolling Mill Company started up today for a week's run.

The skelp mill of the Susquehanna Iron & Steel Company at York is closed owing to the dullness in the pipe trade.

Trade Publications.

Wood Working Machinery.—J. A. Fay & Co., 513 to 533 West Front street, Cincinnati, Ohio, have just issued a very handsome and complete illustrated catalogue of 394 pages, showing the different machines they make. A large number of the machines described have been patented in 1900, and embody the latest designs and inventions in the wood working machinery industry. No less than 28 machines have been protected by letters patent since January 1, 1900, to say nothing of those issued in the latter part of 1899, some as recent as December 19. The large technical department employed by this enterprising firm and presided over by Thos. P. Egan, the president, is in the main responsible for this great number of improvements. While the firm are classed as an old house, having had an experience of almost three-quarters of a century, they do not rest their claims upon what they have done in the past, but keep to the front in the introduction of improvements.

Oil Rivet Forge.—We have received a circular from the Rockwell Engineering Company, 26 Cortlandt street, New York, descriptive of their portable oil rivet forge. This is a safe and economical forge which will meet the requirements of the most exacting. It carries a high, soft, uniform heat, always under the control of the operator. The rivets are always in plain sight, quickly heated and easily reached. The forge can also be used for light forging, hardening and annealing. It uses either fuel oil, kerosene or gasoline.

The Bethlehem Works.—A handsome publication has recently been issued by the Bethlehem Steel Company, South Bethlehem, Pa., regarding their products and processes. It is intended to cover in this work of 108 pages such complete information as will enable all interested to understand the scope of the work conducted by this great company. Views are given not only of the works at South Bethlehem, but also of iron ore mines in the Island of Cuba, from which ore used by the company is chiefly obtained. The different departments are separately described and the methods used are quite fully set forth. The special processes of subjecting ingots to fluid compression and of treating armor plate are illustrated, and the machine shops are shown. These are followed by numerous views of armor plates after having been tested in the Government proving grounds, and views are then given of processes of manufacturing ordnance. Illustrations are further presented of forgings of various kinds turned out by the company. The illustrations are all half-tones. The publication is one of the most interesting that has so far been brought out by steel manufacturers.

Milling Machines.—The new catalogue of the Ingersoll Milling Machine Company, Rockford, Ill., is an ex-

ceptionally fine publication. It not only illustrates the various styles of machines built by the company, but goes into full details of their construction, and besides it shows the manner in which milling machines are used in finishing very heavy pieces. The company build heavy type milling machines exclusively, from 20 inches wide to any width required.

Modern Methods of Conveying.—An interesting illustrated pamphlet has been issued by the Link-Belt Machinery Company, Chicago, descriptive of the methods employed in handling packing house products, for which modern methods of conveying are largely used. The methods here illustrated are, of course, those which have been devised by the Link-Belt Machinery Company, whose prominence in this particular field of mechanical development is well known.

Iron Ores.—Oglebay, Norton & Co., Wade Building, Cleveland, Ohio, and Harrison Building, Philadelphia, have issued a vest pocket companion for those interested in iron ore. Analyses are given of practically all of the Lake Superior ores, as well as some Cuban ores, together with statistics of ore shipments in recent years from the several mines. The book is bound in fine leather.

Analyses of Pig Iron.—We have received an advance copy of a book published by Seymour R. Church, 307 Sansome street, San Francisco, Cal., on "The Analyses of Pig Iron," which he has copyrighted. It contains valuable information for foundrymen relative to the effect produced on castings by the various constituents of iron, an article on the grading of pig iron by W. T. Shepard, secretary of the Tonawanda Iron & Steel Company, and many analyses of brands of pig iron from the various sections of the United States as well as from foreign countries. The work is of an ambitious character, and will undoubtedly be found extremely interesting to consumers of pig iron. It is a publication handsomely gotten up, printed on plate paper and substantially bound in boards. The contents comprise about 120 pages of analyses which have been sent to Mr. Church direct either from furnace owners or agents. It will be ready for delivery in July, and will be sold at \$2.50 per copy in the United States and Canada, and 12 shillings in foreign countries, postage paid.

Arc Lamps.—The Lea Mfg. Company, Elwood, Ind., have issued a beautiful little catalogue descriptive of the Lea inclosed arc lamps for all circuits. The inclosed lamp is rapidly making headway against the open arc lamp. In the inclosed lamp the light is better, the attendance is reduced to a minimum, no dirt or carbon dust is formed to spoil goods, and in every way the lamp is desirable. The length of the Lea lamp is the shortest admissible to allow the use of full length carbons. These lamps are made of graceful design and are ornamented to any degree desired.

Industrial Railways.—The C. W. Hunt Company, 45 Broadway, New York, have issued a handsomely illustrated pamphlet describing an installation of the Hunt industrial railway in the large manufacturing establishment of Ludw. Loewe Company, Berlin, Germany. The track of this railway is narrow gauge, being but 21½ inches. The curves are all of 12-foot radius, a curvature so small that every part of a shop can be reached without difficulty or loss of space. Illustrations are given of the yard of the works and of interiors of various departments showing the manner in which the railways reach all portions of the works. A view is also given of the method of fitting together the cast plate track and switches. The company's catalogue 002, also just received, goes into the subject of railways of this character comprehensively, giving full details relative to cars, tracks, rails, scales, &c. This catalogue comprises 32 pages.

Machine Tools.—One of the handsomest catalogues we have ever received comes from the Bullard Machine Tool Company of Bridgeport, Conn. This company began the manufacture of machine tools in 1880. During the past 20 years the constant endeavor has been to make these tools better in every possible way, so that they now represent the highest development in their various classes. The proof of the high standing of these tools is shown by the fact that increased facilities have been made necessary from time to time, until from the little room containing 1800 square feet, now used as the office, the plant now occupies a space of over 100,000 square feet. It is thoroughly modern in every way, and fully equipped with the latest and best devices for handling work economically and promptly. Some of the machines illustrated and described are boring and turning mills,

turret machines, lathes, &c. Their 62-inch boring and turning mill, provided with one regular head and one special head, is made only to order. The table of this machine is 58 inches in diameter, is powerfully geared and has 16 changes of speed. The teeth on both table and pinion are accurately planed. The regular head can be set at any angle and carries the tool bar, which has a movement of 30 inches. The special head has a revolving spindle, and is designed especially for engine work, and for boring and turning crank pin and shaft holes without moving the work after it has been once secured. The feeds on the first head have eight changes, and range from 3-64 to $\frac{1}{4}$ inch horizontally, and from 1-64 to $\frac{1}{2}$ inch in angular and vertical directions. The special head has vertical feed only and ranges from 1-32 to $\frac{1}{2}$ inch. The cross rail is raised and lowered by power.

Electric Generators and Motors.—As a souvenir of the visit of the American Society of Mechanical Engineers to Cincinnati the Bullock Electric Manufacturing Company of that city prepared a very elegant pamphlet, consisting of illustrations of their works and of the various types of electrical apparatus built by them. The illustrations are remarkably clear and sharp, and consist of views of generators, motors, boosters, &c., together with many different electrically driven tools, including drills, laundry mangles, planers, profiling machines, shapers, printing presses, punches, boring mills, wheel presses, &c.

Worcester Board of Trade.—Worcester, Mass., possesses a very live commercial organization in its Board of Trade. We have just received a copy of their annual report for 1899, which is a most interesting publication. It not only presents the usual information relative to the annual meeting, lists of officers, &c., but also much matter bearing on the advantages of Worcester as a location for manufacturing industries. Numerous views are given of the manufacturing establishments of Worcester, and much valuable statistical information is presented relative to the prominence of this thriving industrial center. The report comprises 176 pages and is beautifully printed and substantially bound.

Vacuum Pumping Engine.—The E. W. Bliss Company of Adams street, Brooklyn, N. Y., have issued an interesting little pamphlet of 17 pages setting forth the merits of the Bliss-Heath patent vacuum or atmospheric pumping engine for unskilled labor. Numerous illustrations are presented showing the engine in various positions, an interior of the erecting shops of the company showing some Bliss-Heath pumps in the foreground, and a view of the exterior of the machine shops where the pumps are made. This pump is designed to raise water from any source to tanks, so as to furnish a never failing supply for the upper stories of city buildings, where the pressure is inadequate, and for country residences, barns, lawns, &c. The motor is novel in design, consisting of a vacuum or atmospheric engine, operating a water pump, a low pressure tubular steel boiler, loaded to 1½ pounds steam pressure, and a central acting air pump. The manufacturers point out that no licensed engineer or skilled mechanic is required to operate the engine, as any house servant of ordinary intelligence can run it with safety and efficiency.

Coal Mining by the Six-Entry System.—H. M. Chance, 420 Drexel Building, Philadelphia, Pa., has enlarged, rewritten and printed in pamphlet form a description of his patented six-entry system of coal mining, which was the subject of a paper read by him before the February meeting of the American Institute of Mining Engineers.

The Carlin Machinery & Supply Company, Allegheny, Pa., have issued a stock book giving quite an extended list of machinery which they have on hand, comprising hoisting engines, boilers, vertical engines, horizontal engines, gas and gasoline engines, pumps, air compressors, jacks, machine tools, &c. They are well equipped for furnishing all classes of contractors' machinery.

The Tanite Company, Stroudsburg, Pa., manufacturers of emery wheels, are distributing printed copies of an extremely entertaining letter which they have written in reply to an unnamed correspondent who has asked them for the exclusive sale of all their goods for Siberia, Manchuria, Southern Russia and Japan, and has requested that the prices shall include delivery either at New York or San Francisco, as desired; also asking for printed matter at the expense of the company, in the Russian language, such matter mentioning the correspondent as their exclusive agent, and to supply him free with certain samples, stating that other concerns in their line have agreed to do this. The letter is decidedly facetious and is a delightful exposure of those who are seeking at

the present time to secure a foothold in the export trade at the expense of manufacturers. Copies of it will doubtless be sent by the Tanite Company to those who wish to enjoy a bit of spicy commercial literature.

The Union Steel Company.

We have been officially advised by S. H. Waddell, secretary of the Union Steel Company, that this corporation have completed purchases of 700 acres of land at Webster, on the Pittsburgh, Virginia & Charleston Railroad, about 40 miles from Pittsburgh. The Union Steel Company will establish on this site a modern town, and broke ground on Monday, May 28, for a complete modern rod, wire and wire nail plant. The Union Steel Company have been buying land on Monongahela River for several years, but it was only last week that the last tract desired was secured. They now own over 2 miles of river frontage on a great bend midway between Charle-rol and Monongahela City, including 150 acres of fine level land between the railroad and the river. The rod, wire and wire nail plants will be built on the Castner Farm, which lies on the river bottom about three-quarters of a mile from West Columbia.

The company will build two 600-ton blast furnaces, and 10 or 12 basic open hearth steel furnaces of 50 tons capacity each. The rod mill will be 40 feet long and 333 feet wide, and will contain a continuous roughing mill of 700 tons daily capacity, twin Garrett finishing mills of 600 tons daily capacity and a continuous finishing mill of 100 tons daily capacity. These will produce 700 tons of rods. The wire will be drawn, nails made, wire fence woven and barbed wire made in an iron frame building, 200 feet wide and 780 feet long, with slate roof and brick walls. This building will also be used as a cleaning house. The machine shop, annealing and galvanizing departments will be contained in a brick, iron frame and slate roof building, 100 feet wide and 780 feet long. The power building will be 50 feet wide and 436 feet long, and will contain boilers with an aggregate capacity of 10,000 horse-power. Other large buildings for warehouses, storage rooms and for various purposes will be built. The new mills will contain the most improved wire machinery, and will be so arranged that the great tonnage will be handled with the least possible expense. Labor saving machinery will be largely employed. So far as now intended the Union Steel Company will make rods, plain and galvanized wire, nails and staples of every description, woven wire fencing and barb wire.

It is the intention of the Union Improvement Company, which will control the town site, to build the foundations for the works. The steel buildings will be erected by the McClintic-Marshall Construction Company of Park Building, Pittsburgh and Pottstown, Pa., and the Shiffer Bridge Company, the latter now owned by the American Bridge Company. They are to be completed under the terms of the contracts within the next 90 days, or on September 1.

All the work will be done under the supervision of Garrett & Cromwell, consulting engineers, of Cleveland. The Braddock Machine & Mfg. Company of Braddock, Pa., are now completing \$100,000 worth of wire making machinery, and the Frank-Kneeland Machine Company of Pittsburgh, are building the rod mill. The Southward Foundry & Machine Company of Philadelphia are building four Porter-Allen engines, of an aggregate horse-power of 8000, and the Bates Machine Company of Joliet, Ill., are constructing three Corliss engines for the wire and nail mills, having an aggregate horse-power of 2500. The Stirling Boiler Company of Barberton, Ohio, are constructing boilers, with an aggregate capacity of 10,000 horse-power. The contract was let a few days ago to the Charleroi Brick Company for 6,000,000 brick for the big buildings.

The machinery for the great rod and wire plant was ordered about a year ago, when the Mellons first took up the subject with W. H. Donner. Almost all of the machinery is ready for installation, and as soon as the buildings are complete the machinery can be placed on the ground. It is expected that the work will be rushed with such speed that the plant can be operated by January 1, 1901. It is the intention to push work as fast as possible on the rod, wire and wire nail mills, and they will be put in operation first, the company buying their open hearth steel in the open market. After the finishing mills have been started work will then be pushed on the two blast furnaces and the basic open hearth plant. It is the intention to install one of the finest open hearth plants that can be built.

The Union Steel Company were organized in Pittsburgh more than a year ago, and it has been the supposition right along that Henry C. Frick is interested in the company. The officials are W. H. Donner, president; A. W. Mellon, vice-president; S. H. Waddell, secretary, and R. B. Mellon, treasurer. Offices are maintained in the Carnegie Building, Pittsburgh.

The Iron Age

New York, Thursday, May 31, 1900.

DAVID WILLIAMS COMPANY,	-	-	-	-	-	PUBLISHERS.
CHARLES KIRCHHOFF,	-	-	-	-	-	EDITOR.
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JOHN S. KING,	-	-	-	-	-	BUSINESS MANAGER.

The March of the Open Hearth Process.

The proceedings of the Iron and Steel Institute at London, to which reference was made in our last issue, have freshly called attention to the strides which the open hearth process is taking in securing the favor of steel makers. In competition with the Bessemer process, relatively greater progress has been made in Great Britain than in this country. More steel is there made by the open hearth than by the Bessemer process. This is probably due to the fact that so large a part of the product of British steel is used in filling requirements for shipbuilding, open hearth steel being preferred to Bessemer in the manufacture of plates. In this country other consumptive requirements are far greater than those taking plates. The tonnage going into rails, wire, pipe skelp, hoops, bars and sheets constitutes the great bulk of our steel product, and to these forms the Bessemer process has been well adapted. For a long time our steel development lay more in the direction of increasing the Bessemer output than in enlarging the application of any other steel making process. A good reason for this is found in our possession of great bodies of ore suited to the production of Bessemer steel. The managers of our Bessemer works also acquired remarkable skill in manipulating their converters so as to secure a product which should meet the demand for a metal of special quality.

As long as the open hearth process was used exclusively for the production of acid steel, little headway was made in the matter of tonnage. The acid open hearth furnaces were introduced to only a moderate extent, and for the manufacture of a special product intermediate in cost between Bessemer and crucible steel. With the adoption of the basic bottom, a new era opened for the open hearth. Enabling large quantities of scrap to be used, as well as pig iron of a cheaper grade than Bessemer, and turning out a product of uniform quality at a cost approximating that of Bessemer steel, the basic open hearth process has in recent years made remarkable progress. It now stands so high in favor that new open hearth plants are numerous, and important additions are being made to old ones. The only addition to Bessemer capacity in a long time is the plant of the Republic Iron & Steel Company, at Youngstown, Ohio, now approaching completion, and even that is not strictly a new plant, but rather the relocation of an old works. The great demand for steel in the past year, which led to much activity in the erection of open hearth furnaces, could not restore vitality to quite a number of Bessemer works which had been laid off during the previous depression.

For the purpose of ascertaining the growth of the open hearth steel industry we have instituted inquiries as to the additions made to open hearth capacity since the beginning of 1899, and herewith place the results of these inquiries before our readers. The absolutely new plants built in this time are as follows:

New York Steel & Wire Company, Astoria, L. I. Two 30-ton furnaces.
Mesta Machine Company, Pittsburgh, Pa. One 20-ton.

Tyler Charcoal Iron Tin Mills, Washington, Pa. One 20-ton.
Union Steel Casting Company, Pittsburgh, Pa. One 15 and one 20-ton.
Pittsburgh Steel Foundry, Glassport, Pa. Five 20-ton.
Westinghouse Machine Company, East Pittsburgh, Pa. Two 40-ton.
Pennsylvania Malleable Company, McKee's Rocks, Pa. Three 35-ton.
Page Woven Wire Fence Company, Monessen, Pa. Two 15-ton.
Diamond State Steel Company, Wilmington, Del. Five 50-ton.
Cumberland Steel & Tin Plate Company, Cumberland, Md. One 15-ton.
Alabama Steel & Shipbuilding Department of the Tennessee Coal, Iron & Railroad Company, Ensley, Ala. Ten 50-ton.
Falk Mfg. Company, Milwaukee, Wis. One 15-ton.
Columbus Malleable & Gray Iron Casting Company, Columbus, Ohio. One 10-ton.
Ohio Steel Mfg. Company, Canton, Ohio. One 15-ton.
Republic Iron & Steel Company, Minneapolis, Minn. Two 10-ton.

The additions made to old plants were as follows:

American Steel & Wire Company, Worcester, Mass. Four 50-ton.
A. & P. Roberts Company, Pencoyd Iron Works, Philadelphia, Pa. One 75-ton and one 30-ton.
Lukens Iron & Steel Company, Coatesville, Pa. Six 50-ton.
Tidewater Steel Company, Chester, Pa. Two 45-ton.
Pennsylvania Steel Company, Steelton, Pa. Two 40-ton.
American Steel Casting Company, one 25-ton at Thurlow, Pa., and one 25 and two 20-ton at Sharon, Pa.
American Sheet Steel Company, Apollo Works, Vandergrift, Pa. One 30-ton.
Carnegie Steel Company, Pittsburgh, Pa. Fourteen 50-ton at Homestead Works.
Lorain Steel Company, Johnstown, Pa. One 15-ton.
American Steel & Wire Company, Cleveland, Ohio. Four 50-ton.
National Enameling & Stamping Company, Granite City, Ill. Three 30-ton.
Peru Steel Casting Company, Peru, Ind. One 15-ton.
In addition to the above, the following is a list of open hearth furnaces now building:
United States Steel Company, Boston, Mass. Two 15-ton.
National Wire Corporation, New Haven, Conn. Two 10-ton.
Duquesne Steel Foundry Company, Corapolis, Pa. Two 25-ton.
Carnegie Steel Company, Pittsburgh, Pa. Twelve 50-ton at Duquesne Works.
Sharon Steel Company, Sharon, Pa. Eight 50-ton.
Union Steel Company, Pittsburgh, Pa. Ten 50-ton.
J. S. Coxey, Mount Vernon, Ohio. One 25 and one 15-ton.

American Rolling Mill Company, Middletown, Ohio. One 25-ton.
Scullin-Gallagher Iron & Steel Company, St. Louis, Mo. One 20-ton.
Cosey Steel Casting Company, Mount Vernon, Ohio. Two 20-ton.

Further than this, we are informed by a large engineering company that they have contracts for no less than 36 50-ton, 4 40-ton, 2 20-ton and 1 100-ton furnaces, of which they are at present not permitted to disclose further particulars.

Of the furnaces enumerated in the above list, all are

basic, except those belonging to works making steel castings, tin plate and sheets.

The list, it may be stated, is not claimed to be perfect. Our readers may know of some omissions, notwithstanding the efforts made to secure full information. It is presented, however, to emphasize the fact that the open hearth steel process is making very great progress in this country, and seems destined at no distant day to divide honors in tonnage produced with the Bessemer process.

The Arbitration Agreement in the Machinery Trade.

The substantial and satisfactory agreement between the concerns in the machinery trade, organized under the name of the National Metal Trades Association, and the very strong and well managed trade union known as the International Association of Machinists, establishes the principle that employers and wage earners can co-operate for mutual advantage and protection. There is nothing new in the plan on which this agreement has been effected, unless it be the amount of solid common sense which has been injected into the negotiations and the admirable self restraint and courtesy which permitted a discussion of issues submitted for arbitration lasting from May 10 to 18, and resulting in agreements satisfactory to both sides, without a trace of friction or a word calculated to leave an unpleasant impression on the minds of the participants. The representatives of the manufacturers were broad minded men of affairs, who came to talk business and had neither time nor disposition for anything else. The representatives of the machinists were intelligent, discreet and reasonable, and quickly showed that they were as capable, as well informed and as courteous as the employers. There was nothing tentative about the discussion. Both sides approached it with the understanding that they were authorized to fully commit those they represented to the acceptance of what they might agree upon, and that their business was to reach an agreement at once fair and liberal, in which neither side should have an unfair advantage of the other. When the adjustment of trade differences is approached in this spirit, agreements which are just and satisfactory can usually be reached. The fuller the discussion preceding them, the greater their educational value for all in interest.

The history of the present amicable relation between manufacturers and workmen in the machinery trade is interesting. On March 17 the Administrative Council of the National Metal Trades Association convened in Chicago and adopted the form of a joint arbitration agreement with the International Association of Machinists. One of the conditions of this agreement was that, pending its ratification by the two organizations, and while arrangements to carry it into effect were in progress, there should be no strikes and no lockouts, and that all strikes or lockouts then existing should be at once officially "called off" and terminated. This provision of the agreement was distasteful to the International Association of Machinists. President O'Connell expressed strong approval of the principle of national arbitration in general, but wanted it applied at once to the differences underlying the strike then in progress in Chicago, without declaring it off before the merits of the issue had been passed upon. The Administrative Council of the National Metal Trades Association being unwilling to accept this condition, the conference closed without having reached a binding agreement. The matter was left open, however, should the machinists care

to proceed along the lines indicated. The local strife continued some two weeks longer, the manufacturers affected by it standing loyally by the ultimatum of their association. No advantage promising to result to either side from a prolongation of the contest, the manufacturers made certain propositions which they engaged to carry into effect at once if the agreement of March 17 was signed by the International Machinists' Association, the strike called off and work resumed not later than the following Monday. Their overtures were met in a friendly spirit, and the executive officers of the International Machinists' Association agreed to accept the conditions and be governed by them; the strike was abandoned and work was resumed on Monday, April 2, with mutual good feeling and satisfaction.

The agreement of March 17 was thereupon signed and went at once into effect. It recited, by way of preamble, that the signing parties believed in the principle of arbitration and deprecated strikes and lockouts, and that past experience had warranted the belief that mutual agreements would be of advantage to employers and employees. The resolution was as follows:

Resolved, That in all pending disputes, and in disputes hereafter to arise, between members of the respective organizations—i.e., an employer and his employees—every reasonable effort shall be made by the said parties to effect a satisfactory adjustment of the difficulty; failing in which, either party shall have the right to ask its reference to a committee of arbitration which shall consist of the presidents of the National Metal Trades Association and of the International Association of Machinists, or their representatives, and two other representatives from each association, appointed by the respective presidents. The findings of this committee of arbitration, by a majority vote, shall be considered final as regards the case at issue, and as making a precedent for the future action of the respective organizations. Pending adjudication by the committee of arbitration there shall be no cessation of work at the instance of either party to the dispute. The committee of arbitration shall meet within two weeks after the reference of the dispute to them.

In furtherance of this agreement a conference was held in New York between the Administrative Board of the National Metal Trades Association and the committee representing the International Association of Machinists. This was, in fact, a high court of arbitration. Both committees were in close touch with the interests they represented, and subsequent dissatisfaction with their conclusions was thus avoided. Before any question was taken up for arbitration, the strikes in Paterson, N. J., and Cleveland, Ohio, were declared off, and the conference then proceeded to business. The differences submitted for arbitration were disposed of to the satisfaction of both sides, and the session established the fact that there are no questions which cannot be answered better, more quickly and more cheaply by arbitration than by any other means yet tried. This is a truth so obvious that it should not have needed a demonstration to establish it. The locomotive engineers found it out early in their experience as an organization, and this discovery has made them invincible as a power for good.

In making the results of arbitration binding upon those affected by them, the co-operation of the allied organizations is needed. This has been pledged, and the firm of machinery builders or local lodge of the machinists' union refusing to accept in good faith the decisions of the Arbitration Board, and to honorably carry out the same, will be promptly dropped from membership and left to fight their own battles in their own way. The right to quarrel is, no doubt, inalienable, but no one has the right to ask others to do his quarreling for him, nor to expect others to share the consequences of his preference for war when the means of maintaining an honorable peace are open to him. There is little reason to fear

that a board whose members are bound by their acts, and who must themselves accept and conform to what they prescribe for others, will make any serious mistakes of judgment in deciding trade disputes.

An important advantage of the plan adopted in the machinery trades is that, while fully and honorably recognizing the machinists' union, it gives it something to do. Its work is as important as that of the employers' association, and might very well be more important in the event of the necessity arising for disciplinary measures against a firm or company refusing to be bound by the decisions of the Arbitration Board. In this lies the promise of permanence for the good understanding reached. The plan of dealing with the trade unions as foreign powers—formidable, it may be, but to be diplomatically held at arm's length while ultimatums are formulated—has been tried and has failed. A great deal more is to be expected from a system which recognizes the wage earners' union as an equal power with that of the employers, and as having co-ordinate jurisdiction in matters of trade interest. As the machinery trade Board of Arbitration consists of six members, three representing the employers and three the wage earners, it can at any time be tied, which gives the best assurance to be had that it will not be. Intelligent men are rarely obstinate or unreasonable, unless placed in what they consider to be a position of disadvantage. Altogether, the experiment is one of peculiar interest and promise, and, if it makes the walking delegate superfluous, his passing will not be a cause for regret.

American Enterprise in Siberia and China.

American capital, American engineers and American machinery will develop large tracts of proved gold bearing regions in Siberia and Manchuria under concessions granted by the Russian and Chinese governments.

About five years ago some energetic mining engineers, headed by Victor Grot, took up with the Russian and Chinese governments the question of placer and quartz gold mining on an important scale. After prospecting in Siberia country for three years with a large number of Russian prospectors, an area of territory some 400 miles in extent, 150 miles south of Chita, a town of 12,000 inhabitants on the Trans-Siberian Railroad, was selected. In Manchuria land nearly 600 miles in area, situated about 550 miles from Tientsin, was chosen. In both instances the ground was considered good "pay ground," the placer mining showing an average of \$1.25 per cubic yard, while the quartz showed \$16 per ton in free gold. Then came a period of two years' negotiations with the view of obtaining the necessary titles and concessions from the Russian and Chinese governments. Finally, succeeding in securing documents which entitled the applicants to concessions for a period of 99 years, plans for operating the territory on a large scale were duly experimented with and found to work out to such satisfaction that Mr. Grot has sent a representative to this country, who has already engaged 52 experienced American mining experts and ordered \$300,000 worth of the most up to date American mining machinery, besides making preliminary arrangements for the shipment of an additional \$1,000,000 worth.

Among the New York firms who have secured substantial orders are the Lidgerwood Mfg. Company for a Vivian steam scraper having a capacity of 2000 cubic yards of earth per day. This is said to be one of the largest scrapers ever constructed, and certainly the largest ever exported. The same company will also supply two 125 horse-power engines and two 100 horse-power locomotive boilers for driving the scraper. The Prentiss Tool & Supply Company are to furnish lathes, planers, shapers, and other tools necessary to completely equip a good sized machine shop for mining repairs. The A. S. Cameron Pump Works are to furnish two very large piston pumps for hydraulic pumping, and the Morris Machine Works will supply eight large centrifugal pumps. A number of substantial orders have been placed on the Pacific Coast. The Joshua Hendry Machine Works of San Francisco have been awarded a contract for the supply of 17 miles of 15-inch pipe for hydraulic purposes, and a considerable quantity of small mining machinery, including a 20-stamp quartz mill. Baker & Hamilton of the same city will ship a big lot of general

hardware, tools and supplies, also two threshing machines, a number of plows and other American farming implements, it being found that the soil of the mining lands acquired is arable, and it is proposed to grow wheat, corn, &c. The same concern will forward four complete dairy equipments. Dunham, Carrigan & Co., also of San Francisco, are shipping mining supplies, hardware and machine shop tools. Holbrook, Merrill & Stetson are also filling an order for general hardware, barbed wire fencing, &c., while the Risdon Iron Works have secured a contract for a dredging plant to have a daily capacity of 2400 cubic feet of gravel. Other Western manufacturing concerns who have been given good sized contracts comprise the Marion Steam Shovel Company of Marion, Ohio, who furnish two large dredging plants, each to have a capacity of 2000 cubic yards per day; the Russell Company of Massillon, Ohio, five complete saw mills and a 100 horse-power engine for the machine shop; the Star Driller Company, Akron, Ohio, two 8-inch drilling outfits for going to a depth of 8000 feet, to bore for coal, oil and gold bearing ledges, and the James Rees & Sons Company of Pittsburgh, a large dredger, which will have a daily capacity of 2000 cubic yards. The last named will ship the requisite engines and boilers for the equipment of two stern wheel boats for transport on the On-On River, which flows through the gold bearing regions. The promoters, it is stated, will install no less than 50 dredgers within the next 12 months, which will be purchased in America.

Among the American miners engaged are Ashley Smith Bigelow and J. L. Little, who will act as consulting engineers. The former was in charge of the large hydraulic properties in California during its early mining days. Mr. Little will have charge of the surveys. He will have three assistants. John Harvey Fissell, hydraulic engineer, will be in charge of the hydraulics at both the Siberian and Manchurian mining sections. Thomas N. Smith, who was the metallurgist of the Utica Mine at Angel's Camp, will fill the same position in Siberia. W. F. Keenan will be in charge of the dredging plants. A. H. Ward, M.E., will have a responsible position at the Siberian mines, while J. S. Kidd will be the master mechanic.

Not the least interesting feature of the enterprise of the American concessionaires are the means of transportation resorted to so that the machinery, &c., may reach the somewhat inaccessible parts of the globe where the mines are situated. A part of the machinery and supplies has lately been shipped from San Francisco to Tientsin, from which place it will be taken by train to Pekin. From the Chinese capital to the Manchurian mines, a distance of over 500 miles, camels will be employed, as no railroads run in that part of the country and the roads are not of sufficient width to permit the passage of wagons.

A shipment intended for the Siberian mines has just been dispatched from New York by the North German Lloyd line. It will be landed at Reval, on the Baltic Sea, and there loaded into a special train of 25 cars, which will convey it over the Trans-Siberian road to Irkutsk, a distance of no less than 6400 miles. At Irkutsk—where the headquarters of the American mining concern are—the train will be run on a large transfer boat and taken across the great Balkal Lake, the largest in Asia. The train will then continue its journey for a distance of 175 miles until Chita is reached, where the machinery will be transferred to steel wagons to be drawn by steam traction engines to the Siberian mines, which, as already mentioned, are situated 150 miles from Chita. Two 50 horse-power traction engines and eight steel wagons, having a capacity of 20 tons each, have been specially shipped by the Best Traction Company of San Leandro, Cal., for conveying the machinery now ordered and that which will be contracted for in the near future from Chita to the Siberian mining section. The Russell Company of Massillon, Ohio, have also exported five traction engines of 20 horse-power each. The Shunk Wagon Company of Bucyrus, Ohio, have sent eight 8-ton freight wagons, and the Studebaker Bros. Mfg. Company of South Bend, Ind., have shipped eight wagons of 6 tons capacity, all of which will be utilized for shipment of supplies from the Siberian town to the mines. The special train will take fully 30 days to accomplish its journey from Reval to Chita, while the machinery will take 15 days to reach the mines by steam traction from Chita. The distance between the Siberian and Manchurian sections is only 400 miles, as the crow flies, but owing to the mountainous state of the intervening country the camel route is 1500 miles in length.

The Monongahela River Consolidated Coal & Coke Company of Pittsburgh have decided to replace the wooden barges now used for transporting coal with steel ones. It is possible the Monongahela Company will build a plant to manufacture these barges.

The New Yankee Drill Grinders.

The Wilmarth & Morman Company, a corporation recently organized at Grand Rapids, Mich., have purchased the entire business, including factories, plants and good will, of the Fuller Mfg. Company of Kalamazoo, Mich., and succeed that company in the manufacture of the New Yankee drill grinders.

The new corporation is officered as follows: President, L. T. Wilmarth of Grand Rapids, Mich., founder of and for nearly 11 years secretary, treasury and general manager of the Grand Rapids Cycle Company, manufacturers of Clipper bicycles, and which company have recently sold out to the American Bicycle Company; vice-president, S. A. Morman, also of Grand Rapids, who was for over seven years president of the Grand Rapids Cycle Company, and is interested in various other industries; secretary, C. E. Meech; treasurer, Chas. D. Fuller, former owner of the Fuller Mfg. Company.

With abundant capital and largely increased facilities the Wilmarth & Morman Company plan to properly care for the rapidly increasing foreign and local demands for the New Yankee drill grinder, and to make this an exclusive business rather than a side line, and so merit the continued favor of machinery users.

The home office of the company will be at Grand Rapids, where all mail may be addressed, although the offices and factory will be maintained at Kalamazoo until about September 1, consequently mail addressed to either city will reach the company.

The Wilmarth & Morman Company already have in press a fine art catalogue, said to be by far the finest drill grinding machine catalogue ever issued.

In this connection it is not amiss to speak of the phenomenal growth of the New Yankee drill grinding machines. They are sold in every country where there is any iron working done, and from the very first have received the indorsement of the highest mechanical authorities. The doing away with all preliminary adjustments but one in grinding drills of any size within the range of their machines was an epoch marking improvement in this important art. The designing of a complete line of drill grinders, both belt and electrically driven, and for either wet or dry wheels, and covering the enormous range of drills from No. 60 to 5 inches in diameter, has enabled iron workers for the first time in their history to procure machines exactly adapted to their individual necessities.

The Wellman Electric Charging Machine.—The Wellman-Seaver Engineering Company, Cleveland, Ohio, have received orders for Wellman electric charging machines for open hearth furnace work since January 1, 1899, as follows:

Illinois Steel Company, Chicago, Ill.	2
Carnegie Steel Company, Pittsburgh, Pa.	10
Kladno Steel Works, Kladno, Germany.	1
Société Anonyme des Aciéries de Micheville, Micheville, France.	1
National Enameling & Stamping Company, Granite City, Ill.	1
Ontario Rolling Mill Company, Hamilton, Ontario.	1
American Steel & Wire Company, Cleveland, Ohio.	1
American Steel & Wire Company, Worcester, Mass.	1
American Steel & Wire Company, Pittsburgh, Pa.	1
Imperial Steel Works, Japan.	1
Shickel, Harrison & Howard Iron Company, St. Louis, Mo.	1
Diamond State Steel Company, Wilmington, Del.	1
Page Woven Wire Fence Company, Monessen, Pa.	1
Pittsburgh Steel Foundry, Pittsburgh, Pa.	1
Pennsylvania Steel Company, Steelton, Pa.	1
Lukens Iron & Steel Company, Coatesville, Pa.	1
Rombacher Steel & Iron Company, Rombach, Germany.	2
Dominion Steel Company, Cape Breton, Nova Scotia.	2
Carbon Steel Company, Pittsburgh, Pa.	2
Minnesota Iron & Steel Company, Minneapolis, Minn.	1
Phoenix Iron Company, Phoenixville, Pa.	1
Midvale Steel Company, Nicetown, Philadelphia, Pa.	1
Sharon Steel Company, Sharon, Pa.	1
Trubia Arsenal, Trubia, Spain.	1
Cambria Iron Company, Johnstown, Pa.	4
Vickers Sons & Maxim, Sheffield, England.	1
Scullin-Gallagher Iron & Steel Company, St. Louis, Mo.	1
American Steel Casting Company, Sharon, Pa.	1
A. & P. Roberts Company, Pencoyd, Pa.	1
Peru Steel Casting Company, Peru, Ind.	1

The Philadelphia Pneumatic Tool Company report a rapidly increasing demand for their tools. Their chipping and calking hammers seem to be particularly in demand, large orders having recently been received from the Pennsylvania Steel Company, Baldwin Locomotive Works, Brown & Sharpe Mfg. Company, Ingersoll-Sergeant Drill Company, the Bigelow Company, and many other representative concerns. In all cases their hammers were adopted after severe competitive tests. This company have been obliged to more than double the capacity of their shops since January 1. They have established agencies in all the leading cities of Europe and also in Japan.

The Trumbull Mfg. Company of Niles, Ohio, may establish a plant at that place for the manufacture of automobiles.

MANUFACTURING.

Iron and Steel.

The American Steel Foundry Company, St. Louis, have about completed an order for 20 steel gondola cars of 100,000 pounds capacity for the St. Louis, Troy & Eastern Railroad. The entire body and frame are made of structural shapes and plates with the exception of transoms and floor beams, which are of cast steel. For the use of the National Enameling & Stamping Company, at the Granite City, Ill., plant this company are also constructing 18 steel flat cars for 30-inch track gauge. The carrying capacity is 40,000 pounds. All of these cars are equipped with the American steel truck.

At Pittsburgh the case of the Scully Iron & Steel Company against the Old Meadow Rolling Mill Company, Scottdale, Pa., taken over by the American Sheet Steel Company, was taken from the jury and will be decided by the court upon several points of law at issue. The suit was for damages alleged to have been sustained by reason of a breach of contract for furnishing the plaintiff steel sheets.

The National Enameling & Stamping Company, Granite City, Ill., are preparing to replace the machine shop, which was lately destroyed by fire, with a steel structure. An L of the original rolling mill building will be extended to cover the machine shop area and the traveling crane now serving that part of the rolling mill building will also be extended to deliver rolls directly into the machine shop without rehandling.

The Century Iron Company of New York City have been incorporated with a capital of \$750,000, for the conduct of a general iron and steel business. The incorporators are H. A. Kelly, E. A. Kline, W. C. Merrick, B. P. Bole, V. von den Steinen, all of Cleveland, Ohio; Hoyt, Dustin & Kelly, attorneys, Cleveland, Ohio.

The Manistique Iron Company, at Manistique, Mich., W. H. Nelson, manager, blew in their charcoal furnace on May 17.

Machinery.

The York Mfg. Company, manufacturers of ice making and refrigerating machinery, at York, Pa., have, among others, the following recent orders for their product: A complete 30-ton ice making plant, together with necessary piping, for the cold storage rooms for the People's Ice & Cold Storage Company, Montgomery, Ala.; from the West Jersey Ice Mfg. Company, for overhauling and repairing their ice making plant, including the replacing of the double acting compressors with the latest improved single acting compressor of the York Mfg. Company's make; a 10-ton latest improved can ice making plant for Pinar del Rio, Cuba, and a 35-ton can ice making plant for the Kisen Lake Ice Company at Flushing, Long Island, recently destroyed by fire.

The Pittsburgh Gas Engine Company of Pittsburgh will apply for a charter of incorporation in June. The company are to build gas engines on new lines and patents, for which some strong points of superiority are claimed. The incorporators are Thos. M. Rees, Wm. M. Rees, David A. Rees, H. A. McCall and Jos. H. Blackmore of Pittsburgh, most of whom are identified with James Rees & Sons, engine and boiler builders, of Pittsburgh. The plant of the new company is to be located in the present works of James Rees & Sons, and the equipment for the manufacture of gas engines is now being installed.

The Maywood Foundry & Machine Company have broken ground for their new manufacturing plant at Maywood, Ill. The plans provide for a two-story foundry, 150 x 65 feet, with an extension of 40 x 30 feet; a two-story machine shop, 100 x 150 feet, and an engine house. The building will be of fire proof construction, no wood of any description to be used, and as a novelty in this class of structures, the exterior will be of vitrified glazed tile. The cost, including equipment, will be in the neighborhood of \$100,000.

F. E. Myers & Brother, Ashland, Ohio, manufacturers of pumps of all kinds, hay carriers, forks, pulleys, &c., have given the contract to Benson & Potter of Chicago for a complete electrical power plant. The Sprague Electrical Company of New York will furnish the electrical machinery; Henry R. Worthington of New York the steam pumps, and the Cahall Sales Department a Cahall water tube boiler. The contract for the engine has not been let, but it will be a compound self-oiling machine of the highest type of efficiency.

The Gardner Governor Company have finally decided to remain at Quincy, Ill., in spite of very favorable offers from other cities. They have also decided to erect a new plant and will increase their working force from 175 to 400. The machine shop of the new plant will be 140 x 300 feet, and work will be begun in a short time. The product of the company is the Gardner governor for steam engines.

The Marine Engine Company of New York have been organized for manufacturing and dealing in marine engines. The capital stock is \$5,000,000, and the incorporators are F. W. Speir, L. A. Ludwig, G. E. Bailey, R. H. Monsees, E. S. Price, all of New York City; W. E. Pual, attorney, Hoboken, N. J.

The pay of employees of the Baltimore & Ohio Railroad Southwestern shops at Chillicothe, Ohio, has been advanced as

follows: Molders, from \$2.25 to \$2.40 per day; pipe fitters, from \$2 to \$2.25; machinists, from \$2.25 to \$2.40; boiler makers, from \$2.40 to \$2.50; blacksmiths, from \$2.25 to \$2.40, and helpers, from \$1.40 to \$1.50.

The Richmond Locomotive & Machine Works, locomotive builders, Richmond, Va., are shipping to the Finland State Railways, Helsingfors, Finland, nine 16 x 24 inch ten-wheeled passenger locomotives with six-wheeled tenders complete. This is the second order shipped by the Richmond Works to the Finland State Railways, the first order being for 17 engines.

The Ralston Iron Works, San Francisco, Cal., have been incorporated with a capital of \$25,000, for conducting a general machinery business. The incorporators are H. Ralston, H. J. Ralston, A. Ralston, A. E. Ralston and C. F. Humphrey, all of San Francisco.

The Eagle Foundry & Machine Company of Pittsburgh will apply for a charter on June 4. The incorporators are William Kautz, Frank H. Burkhardt, James T. Wakeman, Frank Humphreys and Joseph Preece.

The Balzer Motor Company of New York have been incorporated with a capital of \$1,000,000, to manufacture and deal in motors and engines, and to acquire inventions, patents and other rights.

The Emerson Pump Company of Washington, D. C., have been incorporated with a capital of \$100,000 to manufacture and sell all kinds of pumping machinery.

Hardware.

The first annual meeting of the stockholders of the Scranton Bolt & Nut Company, Scranton, Pa., was held on the 19th inst. President W. D. Zehnder's report included the statement that during the six months the works have been in operation both mill and factory have been working practically day and night, and that a number of orders were actually declined. The president's plan for enlarging the plant was approved by the directors, and work will soon begin with that end in view. At the present time some 325 hands are employed, and the extension of the works will probably provide employment for 50 more. The former board of directors were re-elected, and they in turn re-elected the old officers. The following are the officers and directors of the company: W. D. Zehnder, president; Charles H. Welles, vice-president; L. M. Horton, secretary and treasurer; E. M. Zehnder, general superintendent; W. D. Zehnder, J. A. Lansing, Chas. H. Welles, John Jermyn, T. H. Watkins, O. S. Johnson and L. M. Horton, directors. A fortunate circumstance, which President Zehnder was pleased to report, was that while excavating for the bed of a tram in the rolling mill a subterranean stream was uncovered which furnishes sufficient water for every purpose except making steam, and there is enough for this purpose, too, if the company wanted to take the risk of using it in the boilers. The chemists to whom it has been submitted say, while it is not free from corrosive elements, it is not impregnated to such a degree as to make it dangerous. It was deemed best, however, to avoid the risk of injuring the boilers, and the city water in consequence is used. About 200,000 gallons of the water from this stream are used daily by the company.

Atlas Mfg. Company, sole manufacturers of the Bradley steel shelf brackets, have purchased a tract of land on Ashmun street, New Haven, Conn., and will erect a factory for the manufacture of these brackets and other wire and sheet metal specialties. This will give them largely increased facilities for the Bradley brackets, which have been on the market for some years, and it is their intention to add to their line other hardware specialties.

The Dayton Roll & Wringer Company, Dayton, Ohio, are engaged in arranging their machinery for the production of wringers, washing machines, &c., and although just starting out advise us that they already have sufficient orders booked to keep them busy for some time to come.

The National Lawn Weeder Company of Pittsburgh will make application for a charter on June 7.

Miscellaneous.

The Standard Scale & Supply Company, Limited, Pittsburgh, Pa., with works at Bellefonte, Pa., manufacturers of scales for all purposes, find their present works in Bellefonte entirely inadequate to meet the growing demand for their scales, and have decided to erect new and more commodious works. They have received numerous offers to locate at different points, but have not as yet definitely decided upon a location for the new works. They have been considerably cramped for room for some time, and as soon as a definite site is selected, work will be commenced on a new factory which will give them at least double their present capacity for the manufacture of scales.

The Eastern Bridge & Structural Company, Worcester, Mass., now have their works in complete operation. The factory is located beside the Fitchburg and Boston & Maine railroads, and their general office is at 58 Front street. A. S. Miller, Jr., treasurer, and R. H. Brown, chief engineer, are men of experience in this line and are well and favorably known. The company advise us that they have several large contracts on hand and are just about to ship a large steel frame building to Porto Rico. They make a specialty of designing, manufacturing and erecting steel structural work of every description.

We have already referred in these columns to the organization of the Keystone Car Wheel Company of Pittsburgh. They will apply for a charter on June 7, and propose to establish in the Monongahela Valley a very large plant for the manufacture of car wheels. Connected with the company are W. L. Elkins and Chas. V. Slocum, the former having been vice-president of the Pennsylvania Car Wheel Company and the latter secretary. This interest was sold out some time ago to the Pressed Steel Car Company of Pittsburgh. Also connected with the new company is Louis B. Whitney, who has been connected with the National Car Wheel Company of Philadelphia, Pa.

Marks Lissberger & Son, 397 West Twelfth street, New York, have purchased the Newport & Providence Lead Works, at Newport, R. I. This plant is now being thoroughly overhauled, and will soon be in operation, making lead pipe, sheet lead, shot, solder and all white metal alloys. The firm state that their two other plants—4. e., the New York Smelting & Refining Works at New York and the Brooklyn Smelting & Refining Works at Brooklyn, E. D., N. Y., have been so far behind orders that in the hopes of relieving the consequent delay they have taken on this third works to supply their Eastern trade.

The Cochran Coal & Coke Company, Dawson, Pa., have purchased 300 acres of coal and 108 acres of surface land on Crabapple Creek, in Fayette County, Pa. The price paid was \$160,000. This was a rare piece of coal land purchased to complete a field, and the price paid was unusually high for that district. The Cochran Coal & Coke Company are closely affiliated with the Washington Coal & Coke Company, miners and shippers of Youghiogheny coal and Washington coke, with general offices in Dawson, Pa., and sales office in Pittsburgh.

The Youngstown Forge Company, Youngstown, Ohio, have decided to secure a new site and increase their capacity considerably, and are considering propositions made them from the neighboring towns of Niles and Sharon, both of which have offered sites gratis. It is possible, however, that they may remain in Youngstown.

The Sharon Roller Works, Sharon, Pa., are erecting a new works in South Sharon, Pa., which will be completed in a short time. They build the Wheeler vertical water tube boiler, and secured a contract some time ago from the Illinois Steel Company for 24 boilers, equal to nearly 10,000 horse-power, to be erected at South Chicago.

The Falcon Bronze Company, brass founders, Youngstown, Ohio, build vats of all kinds for tin plate mills, tubing, shafting, works and others who have occasion to pickle material in sulphuric acid. They recently furnished one of these vats of large size to the Shelby Steel Tube Company.

The large plant of the Reeves Brothers' Boiler Works at Alliance, Ohio, which was moved there from Niles several years ago, was destroyed by fire May 22, causing an estimated loss of \$144,000, with \$40,500 insurance. The fire had such a start that it was impossible to control it. The works will be rebuilt.

The car department of the Atlas Bolt & Screw Company, Cleveland, Ohio, has just received a large order for steel sugarcane cars from Mexico and Honolulu. They also have a contract for steel cars to be shipped to Bermuda.

The entire plant of the Muncie Architectural Iron Works, Hanika & Sons, proprietors, at Muncie, Ind., was completely destroyed by fire on the 17th inst., involving a loss of fully \$30,000. Hanika & Sons will rebuild at once.

The Pittsburgh Steel Shafting Company, with works at Rankin, Pa., and offices in the Park Building, Pittsburgh, have given their skilled workmen a voluntary advance of 10 per cent. in wages.

The Burger Iron & Wire Works Company, Akron, Ohio, are at present erecting a 66 x 75 foot brick addition to their plant, to be used as their new ornamental iron work department.

The Manufacturers & Consumers' Coal Company of Pittsburgh have made application for a charter with a capital of \$100,000. The company will manufacture coke.

It is possible the plant of the Youngstown Forge Company, at Youngstown, Ohio, will be removed to Sharon, Pa.

The National Steel Company have opened a branch office at 78 Gracechurch street, London, E. C., England, to handle their foreign business.

The Monongahela Machine Tool Company, German National Bank Building, Pittsburgh, representing the Northern Engineering Works of Detroit, Mich., have received a contract from the Westinghouse Electric & Mfg. Company, East Pittsburgh, for three 5-ton electric traveling motor cranes.

The Chicago Pneumatic Tool Company, Chicago, Ill., have just made a shipment of a complete compressed air plant for the Kawasaki Dock Yards, Japan. The shipment includes a large electrically driven air compressor, pneumatic hammers, drills, shell riveters, &c. President J. W. Duntley, who has been abroad in the interest of his company for some months, cabled a few days since that he had closed orders for 1000 additional tools.

The Iron and Metal Trades.

The best that can be said for the Iron market at present is that a feeling of hopefulness is developing. The demand seems to be a little better in some branches of the trade, and buyers are disposed to place orders rather more freely. This is particularly true of the West. When this has been said, however, it covers about the most encouraging conditions to be noted. No improvement is seen in prices. The tendency appears to be still downward, and so far no indications are seen of a firm foundation for such products as are not absolutely controlled by an effective consolidation or combination. Prices have been gradually receding for some time, and while heroic efforts are made to maintain them in some directions, this simply results in creating a great spread in quotations. Prices for this reason on some products show a range of several dollars per ton. Wire Rods, for instance, are quoted at mills in the Central West at \$38 to \$47.50.

It is generally believed that a large tonnage is waiting to be placed as soon as prices shall have touched a figure that will be considered satisfactory to buyers. How far down they must go in order to meet this condition it is, of course, difficult to say. When prices were at their height it would certainly have been deemed favorable to new business for concessions to be made approximating present prices. Buyers, however, always seek to secure something a little lower than the offers made to them. It is likely that the fact that this is a Presidential year may influence this reserved business more than the mere question of prices. Undoubtedly, in all discussions of conditions now affecting trade, the Presidential election is invariably taken into consideration.

One of the interesting items of news coming out during the week is the reported sale of 75,000 tons of Pig Iron by a large Southern company for export to Scotland, the shipments to cover the next six months. The reputed sellers will neither affirm nor deny the report, but it is quite generally believed to be true.

A large contract to be placed within a few days covers the approaches to the new East River Bridge between New York and Brooklyn, which will require about 18,000 tons of Steel. This contract would excite much more interest in the trade if the Steel was not limited to acid open hearth, which restricts the number of bidders.

A very important matter now coming up for consideration is the probable disagreement between the Amalgamated Association of Iron, Steel and Tin Workers and the owners of rolling mills in the West over the wages schedule for the year beginning July 1. The association will ask for an advance in the base on which their wages are regulated, and under present conditions the manufacturers will certainly refuse to grant this request. It is expected to lead to the closing of many mills and consequently a decided restriction of production. This will, if continued for any length of time, favorably affect finished products, but will have the opposite effect on Pig Iron. It is assumed by those who are believed to be well informed that the workmen are not averse to taking a vacation this summer, as they have had a long period of uninterrupted employment at good wages. A disagreement, however, between manufacturers and employees which entails the closing of large establishments and the enforced idleness of thousands of workmen cannot but have an unfavorable influence on many branches of trade outside of the one directly interested.

A Comparison of Prices.

At date, one week, one month and one year previous.

Advances Over the Previous Month in Heavy Types. Declines in Italics.

	May 30, 1900.	May 23, 1900.	May 2, 1900.	June 1, 1899.
PIG IRON:				
Foundry Pig, No 2, Standard, Philadelphia.....	\$20.00	\$20.00	\$21.50	\$16.25
Foundry Pig, No 2, Southern, Cincinnati.....	19.75	19.75	19.75	15.00
Foundry Pig, No 2, Local, Chicago.....	21.50	22.50	22.50	16.00
Bessemer Pig, Pittsburgh.....	nom	nom	nom	17.65
Gray Forge, Pittsburgh.....	18.50	19.00	20.00	15.50
Lake Superior Charcoal, Chicago.....	24.50	24.50	25.50	18.00
BILLETS, RAILS, ETC.:				
Steel Billets, Pittsburgh.....	28.00	28.50	30.00	29.00
Steel Billets, Philadelphia.....	31.50	31.50	nom	30.50
Wire Rods, Pittsburgh.....	nom	nom	48.00	.....
Steel Rails, Heavy, Eastern Mill.....	35.00	35.00	35.00	26.00
Spikes, Tidewater.....	2.25	2.25	2.50	1.70
Splice Bars, Tidewater.....	2.20	2.20	2.20	1.50
OLD MATERIAL:				
O. Steel Rails, Chicago.....	15.00	14.50	17.50	12.00
O. Steel Rails, Philadelphia.....	19.00	19.00	21.50	14.50
O. Iron Rails, Chicago.....	16.00	18.50	21.00	18.00
O. Iron Rails, Philadelphia.....	20.00	20.00	23.00	18.00
O. Car Wheels, Chicago.....	24.00	24.00	24.00	15.50
O. Car Wheels, Philadelphia.....	20.00	20.00	22.00	15.00
Heavy Steel Scrap, Chicago.....	15.00	14.00	16.00	11.00
FINISHED IRON AND STEEL:				
Refined Iron Bars, Philadelphia.....	1.70	1.70	1.85	1.60
Common Iron Bars, Youngstown.....	1.90	1.90	1.90	1.70
Steel Bars, Tidewater.....	1.90	1.90	2.10	1.85
Steel Bars, Pittsburgh.....	1.90	1.90	1.95	1.90
Tank Plates, Tidewater.....	1.65	1.65	1.85	2.40
Tank Plates, Pittsburgh.....	1.65	1.65	1.75	2.25
Beams, Tidewater.....	2.40	2.40	2.40	1.65
Beams, Pittsburgh.....	2.25	2.25	2.25	1.50
Angles, Tidewater.....	2.40	2.40	2.40	1.65
Angles, Pittsburgh.....	2.25	2.25	2.25	1.50
Skelp, Grooved Iron, Pittsburgh.....	1.67½	1.70	1.85	1.90
Skelp, Sheared Iron, Pittsburgh.....	1.70	1.75	1.80	2.0
Sheets, No. 27, Chicago.....	3.35	3.35	3.35	3.15
Sheets, No. 27, Pittsburgh.....	3.15	3.15	3.15	2.85
Barb Wire, f.o.b. Pittsburgh.....	2.80	2.80	2.80	2.70
Wire Nails, f.o.b. Pittsburgh.....	2.20	2.20	2.20	2.10
Cut Nails, Mill.....	2.05	2.05	2.05	1.65
METALS:				
Copper, New York.....	16.50	16.75	17.00	15.50
Spelter, St. Louis.....	4.37½	4.49	4.45	4.45
Lead, New York.....	4.00	4.00	4.70	4.45
Lead, St. Louis.....	3.95	3.95	4.45	4.52½
Tin, New York.....	29.45	29.37½	30.00	26.65
Antimony, Hallett, New York.....	9.75	9.75	9.75	10.00
Nickel, New York.....	55.00	55.00	42.00	38.00
Tin Plate, Domestic Bessemer, 100 lbs., New York.....	4.84	4.84	4.84	4.05

Chicago. (By Telegraph.)

Office of The Iron Age, 805 Fisher Building,
Chicago, May 29, 1900.

In most lines of Iron and Steel manufacture there is reported this week a perceptible improvement in the demand. The increased activity, perhaps, approaches very closely to the actual consumption. It is explained partly by the absolute needs of the buyers, but without doubt the users are also a little more disposed to venture forth into the ordinary avenues of trade. In Pig Iron a few inquiries have appeared for deliveries to extend through the entire year. These are as yet so rare as to be notable, but the mere fact of their appearance at all is an indication of changing conditions. With this freer inclination to buy, there is noted also in some directions a concession in values which tends to keep actual orders fairly close to present time in the matter of deliveries.

Pig Iron.—The trade in Pig Iron consists chiefly in small orders. But the important fact exists also that most melters are buyers. There is a multitude of carload purchases being booked every week, and one week is, for a large part of the business, a mere duplication of its predecessor. Some buyers are looking ahead for a month. The majority are contented if they have a week's supply of material contracted for. The few inquiries that have appeared for deliveries running through the remainder of the current year have not been closed, and just how sincere may be the intentions of the inquirers is a matter of conjecture. Values are somewhat sensitive to the touch. If pressure is exerted there is apt to be a little shrinking. Large Southern producers are still quoting old figures, but the bulk of the present trade is done at a shade under these prices. There are a number of recently started furnaces that have no long time contracts booked and are obliged to depend chiefly upon current orders for the disposal of their product. These furnace owners are diligent in searching out buyers, and each transaction stands largely upon its own individual basis, thus making the quotation of prices a matter of uncertainty. We quote for cash as follows:

Lake Superior Charcoal.....	\$24.50 to \$25.50
Local Coke Foundry, No. 1.....	22.00 to 22.50
Local Coke Foundry, No. 2.....	21.50 to 22.00
Local Coke Foundry, No. 3.....	21.00 to 21.50

Local Scotch, No. 1.....	22.00 to	22.50
Ohio Strong Softeners, No. 1.....	23.00 to	23.50
Southern Silvery, according to Silicon.....	25.50 to	27.00
Southern Coke, No. 1.....	22.35 to	22.85
Southern Coke, No. 2.....	21.35 to	22.85
Southern Coke, No. 3.....	20.35 to	20.85
Southern Coke, No. 1 Soft.....	22.35 to	22.85
Southern Coke, No. 2 Soft.....	21.35 to	22.35
Foundry Forge.....	20.85 to	....
Gray Forge and Mottled.....	20.85 to	....
Southern Charcoal Softeners, according to Silicon.....	21.85 to	25.85
Alabama and Georgia Car Wheel.....	24.85 to	25.85
Malleable Bessemer.....	23.00 to	24.00
Standard Bessemer.....	.... to	....
Jackson County and Kentucky Silvery, 8 per cent. Silicon.....	29.00 to	30.00

Bars.—Store trade is in excellent condition. For reasons that are obvious, many consumers are taking material from store repeatedly, and neglecting the mill orders. The volume of business is fairly large. The sizes that are used by implement manufacturers are in good demand, while railroad iron is less active. Steel Bars are firm at 2.10c. from mill, and Common Iron is variously quoted at 1.95c. to 2.05c. From store iron is 2.25c. to 2.35c., and Steel 2.25c. to 2.40c.

Structural Material.—In the small order trade, the totals for the past week show some improvement—enough to be clearly appreciated, but not enough to give occasion for special thanks. The large work is hampered by the labor tie up, and the signs of a settlement appearing last week have failed to result in any present good. Prices are firm. Mill shipments are quoted as follows, Chicago delivery: Beams, Channels and Zees, 15-inch and under, and Angles, 3 to 6 inches, 2.40c.; Beams, &c., 18 inches and over, and Angles over 6 inches, 2.50c.; and under 3 to 1½ inches, 2.15c.; Tees, 2.45c.; Universal Plates, 1.75c. to 1.90c. From local yards small lots of Beams and Channels are quoted at 2.90c. to 3c.; Angles, 2.65c. to 2.70c. rates, and Tees, 2.75c. to 2.85c.

Plates.—From mill there has been a better trade. One lot of 2000 tons and others aggregating 1000 tons were placed. Store sales are without new features, and may be said to be restricted. We quote Tank, 1.75c. to 1.90c.; Flange, 2c. to 2.15c. Jobbers quote Tank from store 2.10c. to 2.20c.; Flange, 2.30c. to 2.50c.

Merchant Pipe.—Fair trade is reported, but values are still somewhat unsettled. Standard quotations on less than carload lots are as follows:

Sizes.	Black.	Galvanized.
¾ to ½ inch.....	46	31
½ inch.....	56	41
¾ inch.....	63	48
1 to 4 inches.....	63	48
4½ to 12 inches.....	60	45
1 to 4 inches, R. & P.....	60	42

Carload lots take 5 per cent. additional discount on these prices.

Sheets.—Orders for the past few days have been very gratifying to sellers, showing an improvement over the previous week. However, the disposition seems to be to provide only for immediate needs, now that the new order of things is thoroughly established. Black Sheets are quoted at 3.50c. to 3.60c. from store for No. 27 Common and Galvanized is quoted 70 to 70 and 5.

Merchant Steel.—Implement makers are beginning to inquire for their wants during the last half of the year, and while the buying on this account is not large, the indications are favorable for good sized engagements. Prices are without change. Mill shipments, Chicago delivery, are quoted as follows: Smooth Finished Tire, 2.40c. to 2.60c.; Open Hearth Spring Steel, 3c. to 3.25c.; Toe Calk, 3c. to 3.25c.; Sleigh Shoe, 2.30c. to 2.50c.; Cutter Shoes, 3.25c. to 3.35c.; Ordinary Tool Steel, 7c. to 7½c.; Special, 13c. and upward.

Rails and Track Supplies.—The matter of deliveries impedes the wishes of a number of buyers for both Light and Standard Sections. Buyers who look for quick returns from the mills meet with deep disappointment. One current inquiry is for 7000 tons of Standard Sections, and the aggregate prospect for early closing is considerable. Prices are without change. Standard Sections are quoted \$35 to \$37, and Light Rails from \$36 to \$40. For Track Supplies prices are as follows: Steel Fish Plates, 2c. to 2.25c.; Iron Fish Plates, 2.25c.; Spikes, 2.50c. to 2.60c.; Track Bolts, with Hexagon Nuts, 3.65c. to 3.75c.; Square Nuts, 3.40c. to 3.50c.; Steel Links and Pins, 2.75c. to 3c.; Iron Links and Pins, 2.75c. to 3c.

Old Material.—A firm foundation has not been struck in the present quicksands, but there are those who are looking for it soon. Scrap seems to be without friends, and has the usual luck of the friendless. The situation is a little different from that of a week ago, except that some new levels have been reached. The current demand seems to be quite limited, and offerings are in excess of needs. The transactions closed consist mainly of small lots, with various Western and Southern cities

as their initial point. Large dealers in the centers of distribution are not factors to the current conditions. Approximate quotations are as follows, per gross ton:

Old Iron Rails.....	\$16.00 to	\$17.00
Old Steel Rails, mixed lengths.....	13.00 to	14.00
Old Steel Rails, long lengths.....	14.50 to	15.50
Relaying Rails.....	25.00 to	27.00
Old Car Wheels.....	24.00 to	24.50
Heavy Melting Steel Scrap.....	13.00 to	14.00
Mixed Steel.....	12.00 to	12.50
Iron Fish Plates and Angle Bars.....	16.00 to	17.00
Steel or Mixed Iron and Steel ditto.....	14.50 to	15.50
Iron Car Axles.....	20.00 to	21.00
Steel Car Axles.....	18.00 to	19.00
No. 1 Railroad Wrought.....	16.00 to	17.00
No. 2 Railroad Wrought.....	14.00 to	14.50
Shafting, Iron and Soft Steel.....	17.50 to	18.50
No. 1 Wrought.....	14.00 to	15.00
No. 1 Country Wrought.....	13.00 to	13.50
No. 1 Mill.....	9.00 to	10.00
No. 2 Mill.....	7.00 to	8.00
No. 1 Busheling.....	11.00 to	12.00
No. 2 Busheling.....	9.50 to	10.00
Iron Car Axle Turnings.....	12.00 to	13.00
Soft Steel Car Axle Turnings.....	11.00 to	12.00
Machine Shop Turnings.....	9.00 to	10.00
Wrought Drillings.....	8.00 to	9.00
Cast Borings and Drillings.....	6.50 to	7.50
Mixed Borings and Turnings.....	6.50 to	7.50
No. 1 Bolders, cut.....	10.00 to	11.00
No. 2 Bolders, cut.....	6.00 to	6.50
Boiler and Ship Scrap.....	13.00 to	13.50
No. 1 Cast.....	11.50 to	12.50
No. 2 Cast.....	8.00 to	9.00
Railroad Malleable Cast.....	14.00 to	14.50
Agricultural Malleable Cast.....	12.00 to	13.00

Metals.—Dullness prevails generally among the Metals. Lead is unchanged, at 3.95c. for Desilvered and 4.05c. for Corroding. Copper is quoted 17c. for Lake and 16½c. for Casting, with little buying.

Philadelphia.

Office of *The Iron Age*, Forrest Building, {
PHILADELPHIA, Pa., May 28, 1900. }

It is wearisome to reiterate the doleful reports of the past several weeks, but a strict adherence to facts leaves no alternative. It is remarkable with what persistency the dullness continues, but it does seem as though all interest was gone, and nobody cared whether there is any business or not. Sales during the week have been on an extremely limited scale, buyers taking just enough to tide them along, lower prices having no influence so far as regards increasing the size of the order. Consumers appear to be well employed, but they are not taking in much new business, hence while the situation is satisfactory at the moment, there is a degree of uncertainty in regard to the future, which casts a shadow over the entire market. How long this will continue it is impossible to say. There are many good features in sight, and if the feeling was less pessimistic, it is not unlikely that there would be a good healthy reaction. Crops promise well, the financial situation is sound and the close of the war in South Africa is likely to bring out a very large amount of business. In Europe excellent conditions prevail, although following prices on this side some reductions have been made, and there is a tendency to postpone large operations until it is seen what our markets are going to do. They fear what the United States used to fear in former times—viz., that their markets may be made a dumping ground for our surplus; but that feeling will be removed if prices in the United States begin to show a firmer front. At present, however, the Iron and Steel markets are almost featureless, unless stagnation and weakness may be regarded as features.

Pig Iron.—Business is as dull as ever, and prices are easy, if not lower. Consumption keeps up satisfactorily, and a great deal of Iron is being melted, but buying is on the smallest scale imaginable. One reason for this is that consumers have been carrying large stocks, and are determined to use them close up before making new purchases. Another reason is that a great deal of Iron, which should have been delivered last year, is being shipped now; and as the prices on these lots run from \$2 to \$5 below to-day's figures, buyers are not likely to take new lots until the old ones are used up. It is conceded that heavy purchases must be made during June or July, but in the meanwhile it seems to be absolutely useless to try to sell Iron promiscuously. Those who need Iron know just how much they want, but they usually figure it down to how little they can get along with, and beyond that it seems impossible to effect sales. The general business situation is satisfactory, and although some falling off is noticeable in all departments, there is no reason to expect further serious shrinkage, and if confidence could be re-established there would be a good chance for a sharp reaction, both in prices and in demand. At present it is difficult to give exact quotations, but the extreme limits at both ends will be found in the following list for deliveries in buyers' yards at seaboard or equivalent points: No. 1 X Foundry, \$22 to

\$22.50; No. 2 X Foundry, \$20 to \$21.50; No. 2 Plain, \$19.25 to \$19.75; Basic, \$21 to \$21.50; Bessemer, nominal, \$22 to \$22.50; Low Phosphorus, \$27 to \$28; Charcoal Iron, \$27 to \$29.

Billets.—No business of any importance, prices nominal at \$31.50 to \$32.

Plates.—There is a fair demand for small and medium sized lots, and some inquiry for large lots for delivery during the fall months, but orders for immediate specification are not sufficient to keep the mills very actively employed. Some are doing fairly; having a considerable amount of back work to finish up, but as a rule they are all hungry for business. Prices are irregular and easy, and on large lots low figures have been named during the past few days, but the usual quotations are about as follows for deliveries in yards of nearby consumers: Steel Plates, $\frac{1}{4}$ -inch and thicker, 1.65c. to 1.75c.; Universals, 1.75c. to 1.85c.; Shell, 1.90c. to 2c.; Flange, 2c. to 2.15c.; Charcoal Iron Plates, C. H. No. 1, 2.80c.; Best Flange, 3.30c.; Fire Box, 3.80c.

Structural Material.—Business in this line is rather dull, although the mills are running full time. Strikes in the building trades at various points and other unsettled conditions are causing postponements in deliveries, and have a discouraging influence, so that there is not as much confidence as was felt some time ago, although the local mills appear to have plenty of work to go on with. Combination prices are maintained, but outside mills are shading small Angles, which have been sold as low as 2.25c., regular quotations being as follows: Beams and Channels, 15 inches and under, 2.40c.; Angles, 3 to 6 inches, 2.40c.; Zee Bars, 2.40c., f.o.b. Philadelphia; Angle Bulbs and Deck Beams, 2.68c.; Tees, 2.45c.

Bars.—Competition is very sharp, and prices are again a shade lower. There is a considerable amount of business being done, but there are too many mills in operation, and the declining tendency will no doubt continue until some of them cease operations, or the demand for Bars improves. At present prospects are by no means encouraging, and some buyers claim to expect still lower figures before there is a settled market. Sales last week were made as low as 1.65c., but to-day 1.70c. to 1.75c. is named for Refined Iron, and 1.90c. to 2c. for Steel Bars.

Sheets.—There is a good demand for thin Sheets, but on the low numbers business is very disappointing. Prices are irregular, but are usually quoted as follows for the best makes (Common Sheets, two-tenths less): No. 10, 2.70c. to 2.80c.; No. 14, 2.95c.; No. 16, 3c.; Nos. 18-20, 3.05c.; Nos. 21-24, 3.15c.; Nos. 26, 27, 3.25c.; No. 28, 3.35c. to 3.45c.

Old Material.—The market is so unsettled that it is hardly quotable. Price depends almost entirely on the necessity for selling, or the necessity for buying, but there is no regular market at the present time. The range of prices for delivery in buyers' yards, however, would be about as follows: Choice Railroad Scrap, \$21 to \$22; No. 1 Yard Scrap, \$16 to \$17; No. 2 Light Scrap, \$12 to \$13; Machinery Cast, \$15 to \$15.50; Heavy Steel Scrap, \$18 to \$19; Old Iron Rails, \$20 to \$21; Old Steel Rails, \$19 to \$20; Wrought Turnings, \$13.50 to \$14; Cast Borings, \$10.50 to \$11.75; Old Cast Wheels, \$20 to \$22; Iron Axles, \$23 to \$24; Steel Axles, \$23 to \$24.

Pittsburgh.

Office of *The Iron Age*, Hamilton Building, 1
Pittsburgh, May 29, 1900.

(By Telegraph.)

Pig Iron.—The Pig Iron market is about as dull and featureless as it could be, and the tendency of prices is downward, with nothing doing, except in small lots. The Bessemer furnaces have not fixed any price on Iron for second half, simply for the reason that there are no inquiries. Should a large consumer of Bessemer Iron come in the market and want some Iron the association would fix a price, but until somebody wants Iron this will not be done. Eastern furnaces have offered Bessemer Iron in the Pittsburgh district market at \$2 or \$3 a ton under the association price, but without finding a buyer. It is simply impossible to sell round lots of Bessemer Iron at any price. A few small lots have been sold at various prices. Mill Iron is also very dull and prices weak. We quote Standard Forge Iron at \$18.50, Pittsburgh, and note two sales of 500 tons each at a trifle under that price. Foundry Iron is selling only in carload lots, and it is doubtful if any large tonnage could be sold even were a low price named. Small lots, ranging

from carloads up to 50 tons, of Standard No. 2 Foundry have sold at about \$21, Pittsburgh, and in some cases slightly under this price.

Steel.—The Steel market is quiet and prices weak, but in the last few days there has been some little inquiry. We quote Bessemer Billets at \$28 to \$29, maker's mill. On a good sized order for Billets running over the next two or three months it is possible that the lower quotations may be shaded.

Sheet Bars.—There are very few buyers of Sheet Bars now, aside from mills owned by the American Sheet Steel Company. A few outside mills have contracted with a leading interest to take a minimum quantity of Sheet Bars monthly, the price for each month's shipments to be the standard market price for that month.

(By Mail.)

It is becoming more evident every day that one thing needed to put the Iron market on a more satisfactory basis than now exists is to restrict production, and the sooner this is done the sooner can be expected some improvement in the trade. It is evident that the output of both raw and finished material at the present time, and for some months, is largely in excess of consumption, and already production is being materially cut down by the shutting down of plants all over the country. One leading interest that controls more than two dozen plants has closed a large number of them in order to reduce output and maintain prices. It is evident, too, that the raw materials, such as Ore and Coke, are heavy in price, and will likely decline to some extent. The downward movement in prices of Pig Iron, Steel and Finished Material is bound to carry prices on Ore and Coke along. There has been no improvement whatever in demand since our last report, and prices continue droopy. The market is gradually settling down to a normal basis, and until this is accomplished the demand will be light. Once buyers become satisfied that prices have reached a normal level they will place orders for the large tonnage which is being held back on account of the declining market. It is probable that the usual summer shut down this year will be more extensive than for several years, as many of the large interests will take advantage of the present depression to make improvements which were contemplated last year, but postponed on account of the extraordinary activity in trade at this time one year ago. The result of the annual meeting of the stockholders of the American Steel Hoop Company, which is to be held in East Orange, N. J., on Tuesday, May 29, is awaited with much interest.

Ferrömanegane.—There is practically nothing doing, and we continue to quote at \$100 for large lots.

Structural Material.—The market has been unusually quiet for some weeks. No large lots have been placed since our last report, the mills running nearly altogether on old contracts placed some time since. As noted in this report last week, there is a good deal of unevenness in prices on small Angles and other Shapes which are being made by outside mills. We quote: Beams and Channels, 15-inch and under, 2.25c.; Beams and Channels, over 15-inch, 2.35c.; Angles, $\frac{1}{2}$ to 6 inches, inclusive, 2.25c.; Angles, over 6 inches, 2.35c.; Zees, 2.25c.; Tees, 2.30c.; Bars, 2c.; Plates, $\frac{1}{4}$ -inch and heavier, 1.65c. to 1.70c.

Iron and Steel Bars.—The market on Bars continues quiet, buyers placing orders only for small lots and actual wants. The nominal price of Steel Bars is 2c., Pittsburgh, in carload lots, but, as stated before, this price is being shaded \$3 or \$4 a ton, or more, by outside mills. The amount of tonnage in Steel Bars being placed at 2c. is quite small. The nominal price of Iron Bars is also unchanged at 1.90c., Valley mill, but this is also being shaded more or less by outside mills.

Sheets.—There is nothing of interest to note in the Sheet trade. The demand is very light and jobbers are making low prices in order to move stocks bought some time since. We quote No. 27 Black Sheets at 3.15c.; No. 28, 3.20c. These prices, however, are shaded a good deal, depending on the order. We quote Galvanized Sheets at 70 and 10 per cent., 15c. freight. The movement in Galvanized Sheets seems to be larger than in Black.

Plates.—There is no improvement in the Plate market, either in demand or price. However, it is believed that Plates have pretty nearly touched bottom, unless there should be a further decline in price of Steel. With Billets at \$28 to \$29 and Plates at 1.65c., they are the cheapest thing in the market. We quote: Tank Plate, $\frac{1}{4}$ -inch and heavier, 1.65c. to 1.70c.; Shell, 1.85c. to 1.90c.; Flange, 1.95c. to 2c.; Marine, 2.05c. to 2.10c.; Fire Box, 2.50c. to 3c., all f.o.b. at mill.

Merchant Steel.—The consolidation of the leading Crucible and Tool Steel manufacturers in the Pittsburgh district, and a few outside concerns as well, referred to in *The Iron Age* of last week, was a surprise to many in the trade and occasioned no little comment. It is understood that the consolidation has been practically effected. The market on Merchant Steel is quiet and prices weak. We quote nominally as follows: Open Hearth Spring Steel, 3.15c., base; Crucible, 4.40c. to 4.50c.; Bessemer Machinery, 2.25c. to 2.35c.; Open Hearth Machinery, 3c. to 3.10c.; Crucible, 4.25c. to 4.50c.; Hammered Lay Steel, 3.75c. to 4c.; Rolled Lay Steel, 3.25c. to 3.50c.; Plow Slabs, Bessemer, 2.25c. to 2.35c.; Open Hearth Steel, 2.50c. to 2.75c.; Tool Steel, 6½c. and upward, on which 25c. freight allowance is made, all 30 days net cash, f.o.b. Pittsburgh. It should be noted that the above prices are merely nominal and are shaded considerably by the mills, depending on the order.

Skelp.—We quote Grooved Iron or Steel Skelp at 1.67½c. to 1.70c. and Sheared at 1.70c. to 1.75c., and note a sale of 1000 tons Grooved Iron at 1.70c., delivered Pittsburgh.

Tubular Goods.—The leading interest has taken a contract for 25 miles of Line Pipe, 4 to 10 inches in size, for an oil line in Indiana. The demand for Tubing is only fair and the general condition of the market is unsatisfactory. There is still some unevenness in prices, but the tone of the market is probably stronger than a week or two ago. We quote the following Pittsburgh basing discounts in carload lots to consumers:

Merchant Pipe.		
	Black. Per cent.	Galvd. Per cent.
½, ¾, 1 inch.....	47½	51½
1½ inch.....	58	62
¾ to 4 inch, inclusive.....	65	69½
4½ to 12 inches, inclusive.....	62	66½
Boiler Tubes.		
	Iron Per cent.	Steel. Per cent.
1 to 1½ inches.....	23	27
1¾ to 2½ inches.....	28½	32
2¾ to 3 inches.....	49½	52
2½ and 9 to 13 inches.....	39	42
Casing.		
	S. & S. Per cent.	I. Jt. Per cent.
2 inches.....	23½	16
2¼ to 2½ inches.....	34½	27½
3 to 4½ and 8½ to 12½ inches.....	43½	38
4¾ to 7¼ inches.....	50	45
7½ inches.....	47½	42
O. D. Pipe.		
	Per cent.	
14 to 22 inches, o. d.....	42	
24 inches, o. d., and larger.....	37	

Coke.—The Coke trade is feeling the effects of the depression in the iron trade. A good deal more Coke is being produced than is being consumed. It is probable some ovens will soon be blown out to restrict production. As noted last week, prices on both Furnace and Foundry Coke are easier, and will probably be lower in sympathy with iron and steel products. Last week there were 19,751 ovens in the Connellsville region active and 512 idle, the output being 206,428 tons, a decrease of 12,231 tons over the previous week. We quote strictly Connellsville Foundry Coke at \$3 to \$3.25 per ton, at oven. We are not advised of any sales of Furnace. Coke made outside of the Connellsville region is being offered at considerably lower prices than these.

Iron and Steel Scrap.—The market is abnormally dull and any Scrap being sold at the present time is at forced sale, the buyer practically fixing the price. The market on Scrap is difficult to quote, owing to so few sales being made. Nominally we quote as follows: No. 1 Railroad Wrought Scrap, \$18 per net ton; Turnings, \$11 net ton; Borings, \$9.50 net ton; Heavy Melting Stock, \$17 gross ton; Iron Rails, \$21 gross ton; Horseshoes, \$17 net ton; Steel Rails, \$20 gross ton.

Cincinnati

(By Telegraph.)

Office of *The Iron Age*, Fifth and Main streets,
CINCINNATI, May 29, 1900.

The situation has changed but slightly since the report of one week ago. What change there is that can be noticed is, however, rather against the stability of the market, and while selling has been and is still practically at a standstill, yet prices are quotably lower and the feeling generally is uncertain. No change is predicted in the coming week, yet the proposition that June will show a stronger situation has plenty of supporters. Freight rate from Birmingham is \$3.25 to this point, from the Hanging Rock district \$1. We quote, f.o.b. Cincinnati:

Southern Coke, No. 1.....	to \$20.75
Southern Coke, No. 2.....	to 19.75
Southern Coke, No. 3.....	\$18.00 to 18.25
Southern Coke, No. 4.....	16.75 to 17.00

Southern Coke, No. 1 Soft.....	to 20.75
Southern Coke, No. 2 Soft.....	to 19.75
Southern Coke, Gray Forge.....	16.75 to 17.00
Southern Coke, Mottled.....	16.75 to 17.00
Ohio Silvery, No. 1.....	to 28.00
Ohio Silvery, No. 2.....	to 27.00
Lake Superior Coke, No. 1.....	to 21.00
Lake Superior Coke, No. 2.....	to 20.00
Lake Superior Coke, No. 3.....	to 19.00

Car Wheel and Malleable Irons.

Standard Southern Car Wheel, Chilling Grades.....	\$24.25 to \$25.25
Standard Southern Car Wheel, No. 2.....	23.75 to 24.25
Lake Superior Car Wheel and Mal- leable.....	to 25.50

Plates and Bars.—The market is dull and uninteresting, with no quotable change in prices. We quote, f.o.b. Cincinnati: Iron Bars, carload lots, 2.03c., with half extras; small lots, 2.35c., with full extras; Bar Steel, in car lots, 2.10c., with half extras; small lots, 2.70c., with full extras; Iron Bar Angles, 1½ x 3-16 inch and larger, in car lots, 2.30c.; small lots, 2.55c.; Sheets, No. 10, 2.50c.; No. 27, Steel, 3.25c.; Plates, 2.25c. to 2.50c.

Old Material.—The situation is dull and weak, with lower prices all around. We quote, f.o.b. Cincinnati, dealers' buying prices (approximate): No. 1 Wrought Railroad Scrap, \$13 per net ton; Cast Railroad Scrap, \$9.75 per gross ton; Cast Machine Scrap, \$10 per gross ton; Axles, \$17 per gross ton; Iron Rails, \$15 per net ton; Car Wheels, \$18.50 per gross ton.

Cleveland.

CLEVELAND, May 28, 1900.

Iron Ore.—The shippers and the carriers of iron ore are commencing to figure on the movement of that commodity during the present season upon an entirely new basis. Heretofore it has been counted that 18,500,000 tons of ore have been under contract to be moved down the lakes, no reckoning being made for a possible falling off in the demand for it. Some of the longer heads, however, looked into the future and made part of the carrying contracts conditionally, taking the tonnage with the understanding that if the ore was to be shipped the contract price would be paid, but if there was no demand for the ore, or if the mines proved not able to furnish the amount covered by contract, those boats chartered for the season would have to be turned into another line of trade. Unless conditions change materially it looks as if some of the charters might have to be abrogated. So far, however, conditions are not alarming, for the falling off in business seems to be due to a temporary rather than a permanent dullness. The supply of ore at the upper lake ports has increased slightly in the last week, but it has not been material. A week ago some of the vessels were compelled, on account of the slack shipment from the mines to lake ports, to wait for their cargoes. This week the supply has been such that a few delays have been experienced and a few wild charters have been made. The wild rate is inconsequential this year, owing to the amount of ore that is to be moved at contract figures. Nominally the rate remains as it has been, 70c. being paid out of Escanaba, and \$1 out of Duluth and ports at the head of the lakes. The Marquette business is so light as to amount to almost nothing, hence no quotation is made on that port. On the basis of the other two ports, if any figure was quoted Marquette would be 85c. The movement of ore away from the lakes continues brisk, the shipment this week being accelerated, if anything. There are few sales, if any, as the demand has been slight, most of the business being done on old contracts. In the discussion, however, there is some talk of shading being done on certain grades of Mesabi ore.

Pig Iron.—There has scarcely been a change in any phase of the market in the last week. The shipment from the furnaces to the buyers' yards has steadily continued, except in a few isolated cases, where the buyers have asked that the shipments be withheld for the present, owing to the fact that stock is piling up in the yards. These cases are decidedly the exceptions. There is still a portion of the product for the first half of the year that has not been sold, and this now is being doled out in carload lots, although the sales in these quantities have been slow of late. The stock quotations on No. 1 Foundry are \$22 and on No. 2 are \$21, although prices considerably below that have been accepted even for small lots. No business is being done in Bessemer, but there is some talk of a shading of the prices. The nominal quotation now is \$24.90, as it has been for several months, but little or no business is being done on that basis. Those who comment upon the situation draw parallels between this season and the same time a year ago. At that time prices which are now being quoted were being made by the very heavy demand for iron and by the big sales that were being made.

Finished Materials.—The weakest part of the market appears to be in Plates, as there is such a slight demand for them. It may be said that practically no business has been done during the week. There have been inquiries on a few large lots, but the deals have not been closed so far. So far as learned the prices have not been shaded below 1.60c., but the demand at that figure has been slight, showing that the market is not very strong. A few new boats are being figured on, but as yet the sales have not been made. This week has seen the prices of the smaller sizes of Angles shaded. The combination prices on 3-inch and over have not been broken, as the demand for those sizes continues good in the East. This is true also of Beams and Channels, so that the old price of 2.25c. prevails. This part of the market is fairly strong. On the smaller sizes of Angles, under 3 inches, the price has been shaded to 2.10c., with no great demand even at that figure. Structural Iron, as a whole, seems to be stronger than any other part of the market, the sales being heavier. Even this has been nothing to boast of this week.

Old Iron.—No change has been seen during the week in the Old Iron market. No business is being done and but few inquiries have been made. The sellers have inside prices, which they are ready to quote if the business presents itself, but no change has been made in the regular quotations. Old Steel Rails are therefore being quoted at \$18.50; Wrought Scrap at \$18 per net ton, and Machine Cast Scrap at \$14.50 per net ton.

St. Louis (By Telegraph.)

Office of The Iron Age, 1305 Chemical Building, St. Louis, May 29, 1900.

Pig Iron.—For Steel foundry use 2000 tons of Missouri Basic Iron were sold since our last report. Sale was made at price asked by furnace and was said to be a satisfactory figure. The local furnace, which is running out Basic, Car Wheel and Malleable Irons, has tonnage booked for the next three months, and sufficient additional business in sight to extend that period another quarter. St. Louis has secured orders from Colorado during the week for Eastern Irons. The amounts were small, to be sure, but it may be taken as an indication that Colorado is consuming its own output of Pig Iron. Inquiries, on the whole, are few in number this week and equally light in tonnage; 50 to 100-ton lots are mainly mentioned. There is a disposition to buy, but the buyer wants to fix the price. Advice to St. Louis agents of Connellsville ovens state demand for Coke is good and that lower prices are not in sight. Furnace shipments are not much better and there seems to be a marked shortage of No. 1 Soft. We quote, f.o.b. cars St. Louis:

Southern, No. 1 Foundry.....	\$21.75 to \$22.00
Southern, No. 2 Foundry.....	20.75 to 21.00
Southern, No. 3 Foundry.....	19.75 to 20.00
No. 1 Soft.....	21.75 to 22.00
No. 2 Soft.....	20.75 to 21.00
Gray Forge.....	18.50 to 19.00

Bars.—Mills do not report much business, but it is known that some of the independents are shading prices as much as \$3 per ton. Jobbers are doing a fair business and say the country trade is to be credited with sending in the bulk of carload business. Local prices are a trifle irregular, but the quotable prices below rule. A fairly good demand exists for Hoops and Bands: Hoops and Bands reported unchanged at 2.70c., base; Iron Bars, 2.10c.; Steel Bars, 2.15c., both base, half extras, East St. Louis, in carloads. Jobbers quote Iron and Steel Bars from 2.25c. to 2.50c., base, full extras.

Rails and Track Supplies.—There is very little change to report. Purchasing agents are holding up everything but immediate needs, in anticipation of lower prices. We quote: Splice Bars, Iron or Steel, 2.25c. up; Track Bolts, with Square Nuts, 3.50c.; with Hexagon Nuts, 3.35c.; Spikes, 2.60c.; Links and Pins, 2.80c.

Pig Lead.—Desilverized cannot be bought under 3.95c. Chemical brand is salable at that price, but producers are holding it at 4c., and 3.85c. is bid for Soft Missouri. Only actual necessities are being provided for. Consumers do not want to be caught with stock on hand on a possible declining market, and producers have no inclination to sell far ahead. Lead Ore maintained its value at \$22.50 per 1000 lbs.

Spelter.—Market shows a complete stand off; 4.37½c. to 4.40c. is quotable range, but it is reported that the first figure must be shaded to secure current orders. Inquiry is exceedingly limited. It is reported that in addition to the Lasalle smelter being shut down the Peru concern has also been closed because of labor differences. Ore has been bought with somewhat greater freedom in expectation of a possible shut down of mines

in the Joplin district. At \$30, which was the highest price, considerably more Ore changed hands than in the previous week.

Birmingham.

BIRMINGHAM, ALA., May 28, 1900.

The Iron market is in a badly mixed condition, and one's opinion is tinged as a rule by his interest. The buyers are convinced that a drop in price is inevitable. The sellers who have well filled order books see no necessity for a drop in values, and "there you are." But while the higher grades of Iron are comparatively steady there have been proportionately larger and more frequent concessions in the lower grades. One seller priced a lot of two grades to a regular customer on basis of current quotations, and was informed that he was 50c. too high on one grade and 75c. too high on the other grade. This but illustrates the unsettled condition of the market. Price-lists on the basis of \$17 for No. 2 Foundry have been sent out, but they do not bring new business or excite any interest. The higher grades of Iron are in scarce supply, and all sellers are in arrears on their deliveries. The largest interest here has been out of the market on these grades for a month or longer. The deliveries on the lower grades have been much better. Stocks have been decreasing during the month in furnace yards, and it is estimated that the report for May 31 will show less on hand than at the end of April. Shipments have been free.

The Tennessee Coal, Iron & Railroad Company have made a new departure, and continue to lead all the rest in the march of progress. On Friday last they made in their Little Belle Furnace, at Bessemer, their first run of Spiegel and Ferromanganese. Heretofore they have been buyers. Hereafter they will be sellers. The furnace will turn out 40 to 50 tons daily. It is an important event to the Iron industry of this district, and it is the first attempt in the South. The Ore comes from Georgia, and exists in quantity sufficient to supply all demand for it.

The Steel mill is working as one harmonious whole, and with its smoothness of operation has increased the output for the month over the corresponding time last month over 1000 tons. Preparations are being made to add to the battery the furnaces so far unused. The company now have under their control all the elements that enter into Iron and Steel making, thus insuring the lowest cost of production.

The Rod and Wire Nail mills report satisfactory progress and results, and are fast getting straightened out in all departments. They have secured R. D. Carver as general sales manager, who was with the sales department at Chicago of the American Steel & Wire Company, and previous to that was secretary of the Barbed Wire Fence Company, at Cincinnati. He is, therefore, well known to the trade.

The amount of Iron shipped this month on account of the export trade has been a surprise. It will cover 15,000 tons or more, and all of it practically is new business. It is now acknowledged that during the recent trip to Europe of a prominent official of the Tennessee Company important sales were made to European buyers. But the particulars, including the price obtained, cannot be secured. Mention has been made of negotiations for a block of 100,000 tons. It was current report that they were successful for 75,000 tons.

At the office of the Tennessee Company they would neither admit nor deny the truth of the report. If it was not true it would probably have been contradicted; and, if true, there may be good business reasons for not authoritatively stating it. The delivery, report says, extended through the first half of 1901. It looks to "a man up a tree" as though the sale was made. If so, the Tennessee Company are in a very comfortable position as to sales.

The rolling mill will close down July 1 for the usual yearly overhauling and the arrangement of the scale of the Amalgamated Iron Workers. There is some uneasiness about the scale, and it is a pretty sure thing that if an advance in wages is demanded the mill will remain shut down.

The Plow factory officials who selected a site near the rolling mill were compelled to abandon it, and locate at Ensley, where they obtained without trouble what they wanted. The interest here that controlled track connections refused the necessary requirements.

A commission has been appointed to take stock in the Attala & Oneonta Railroad, which is about 35 miles long, and is really but a branch of the L. & N. R. R., and will be operated by that system. The capital stock is to be \$200,000. It will probably be a part of the mineral branch of the L. & N. R. R. It traverses an undeveloped country rich in Coal, Iron and timber.

The Juniper Iron Company bought some time since 500 acres of Coal lands at Connellsville, on the L. & N.

R. R., to supply them with their necessary Coke. They have a 7-foot vein. A spur track is being run from the station to the mine, and the 50 Coke ovens there are being rehabilitated. As soon as ready, operations will commence. Large foreign orders for Coal are being offered, extending over considerable time in delivery. But ocean facilities for carrying it so as to meet contracts are so meager that they cannot be favorably considered.

The British Iron Market.

Pig Iron.—In view of the unfavorable advices from the United States, leading to the expectation of keener American competition, the warrant markets have been in a somewhat disturbed condition during the past week, and prices have followed an erratic course. There has, however, been some little improvement as compared with last week, and a movement slightly in favor of sellers has taken place. On Friday last, for instance, Scotch Warrants were at 69 shillings 2½ pence, or 8 shillings 6 pence lower than they were a month ago. On Tuesday they were up to 70 shillings 5 pence, and although yesterday they were down again to 69 shillings 9½ pence, yet that figure shows an improvement on the week. In regard to Cleveland Warrants, they are now more than 6 shillings below the best prices of the year, which were recorded just before Easter, but are still considerably above Scotch, being on Monday 5 shillings dearer, the difference, of course, being usually the other way about. The lull in business continues, but makers are inclined to adhere to their prices. In the Cleveland district No. 3 is still at 77 shillings, but a few small sales have been made at lower rates, 76 shillings having been accepted in exceptional circumstances by producers, while second hands have taken 75 shillings. Hematite is dear and scarce, the stocks in Middlesbrough being under 2500 tons, while in Barrow makers find it difficult to keep pace with the demand. Prices are firm.

Manufactured Iron and Steel.—There is continued activity in all branches of the manufactured Iron and Steel trades. Although in some districts inquiries are reported to be not quite so numerous, and the resultant orders are not sufficient to replace those running out, there is no lack of work at present; makers have enough in hand to keep them going for some time to come. Quotations are firmly maintained generally, the only change of any note being a fall in the price of Steel Ship Plates in Scotland, where makers have reduced their quotations by 5 shillings to 7 shillings 6 pence per ton, bringing their figures down to from £8 5s. to £8 7s. 6d. per ton, less 5 per cent. discount. It has been felt that orders have been checked to some extent by the high prices prevalent, and the reduction will no doubt result in an improvement in business. Manufacturers would have had some difficulty in making this concession but for the decline in the price of raw material.

Engineering and Shipbuilding.—Most of the leading engineering establishments are well supplied with work, and locomotive builders, boiler makers, and all sections of the trade connected with electrical developments continue exceptionally pressed with orders. Marine engineers are busy. The shipbuilding industry is actively employed, although new orders are scarce.

Foreign.—In France mill and forge owners are showing more willingness to accept new orders, and are in some cases even taking big contracts at a little below the recent rates. Consumers consequently suppose that the inflation of prices, having reached its limit, is now on the point of giving way, and they accordingly are tardy in giving out fresh orders. The situation of the Rolled Iron trade in Belgium is causing considerable uneasiness among manufacturers, who find that the high prices of fuel are increasing the cost of production to such an extent that they are quite unable to sell on the foreign markets at a profit. In Germany the Rolled Iron and Steel trades are losing none of their firmness.

Comparison of Prices.—The annexed table shows the current prices compared with those of last week, and of the corresponding period last year:

	May 17, 1900.	May 10, 1900.	May 18, 1899.
	s. d.	s. d.	s. d.
Iron Ore—			
Rubio, Middlesbrough.....	21 3	21 3	15 6
Rubio, Cardiff	20 0	20 0	14 3
Pottery Mine, North Staffordshire.	20 6	20 6	14 6
Hematite, West Coast (at mines)...	17 6	17 6	13 6
Pig Iron—			
No. 3 Foundry, Middlesbrough.....	75 0	75 6	55 6
Warrants	78 9	74 0	55 7
Scotch Warrants, Glasgow.....	69 9½	69 6½	54 1
Hematite Warrants, West Coast ..	81 5½	81 7½	64 5
Cold Blast (Foundry), South Staffordshire	130 0	130 0	105 0
Welsh Hematite, Cardiff	90 0	85 0	63 0

Manufactured Iron and Steel—	£ s. d.	£ s. d.	£ s. d.
Marked Bars, South Staffordshire	11 10 0	11 10 0	8 10 0
Common Bars	10 15 0	10 15 0	7 0 0
Steel Rails, Middlesbrough.....	7 15 0	7 15 0	5 2 6
Steel Rails, West Coast	7 7 6	7 7 6	4 12 0
Steel Rails, Cardiff	7 5 0	7 7 6	5 5 0
Steel Angles (eng.), Middlesbrough	8 12 6	8 12 6	6 10 6
Steel Angles (eng.), Glasgow	8 10 0	8 10 0	7 0 0
Steel Plates (ship), Middlesbrough	8 7 6	8 7 6	7 2 6
Steel Plates (ship), Glasgow.....	8 7 6	8 12 6	7 2 6
Tin Plates, Bessemer IC Cokes, South Wales	s. d.	s. d.	s. d.
	25 9	16 0	12 3

—The Iron and Coal Trades Review, London, May 18, 1900.

New York.

Office of The Iron Age, 232-238 William street, New York, May 29, 1900.

Pig Iron.—The volume of business locally has been considerably better during the past week. Quite a number of foundrymen have bought fair quantities of Iron, not only for immediate delivery, but for shipments extending even three or four months. While this may not be sufficient to base strong hopes on, it is, nevertheless, an agreeable change from the extreme dullness of the preceding weeks. We quote as follows, at tidewater: Lehigh and Schuylkill Irons, No. 1, \$21 to \$21.50; No. 2 X, \$20 to \$20.50; No. 2 Plain, \$18 to \$18.50; Gray Forge, \$17.50 to \$18. Southern brands, No. 1 Foundry, \$22 to \$22.50; No. 2 Foundry, \$20.75 to \$21.25; No. 1 Soft, \$22 to \$22.50; No. 2 Soft, \$20.75 to \$21.25; No. 3 Foundry, \$19.75 to \$20.25; Gray Forge, \$18.50 to \$19.25.

Steel Rails.—The Rail situation is possibly more satisfactory than that of any other branch of the Steel trade. It is believed that the Rail manufacturers have so far booked orders for over 1,800,000 tons for delivery this year. The additional requirements of railroads will probably run the total for the year to over 2,000,000 tons. Inquiries are still being received for fair tonnages and the sales recently have covered good quantities. Among the orders entered were several for export. These included 10,000 tons for Canada and 7000 tons for Mexico. A lot of 10,000 tons of 70 pound Rails is now being offered for resale by parties in this city representing a railroad project which has been abandoned. Manufacturers maintain prices firmly at \$35 at mill in Eastern Pennsylvania for Standard Sections. Angle Bars are quoted at 2.20c. to 2.30c., tidewater; Spikes at 2.25c. to 2.30c.; Square Track Bolts at 3.25c.; Hexagonal Track Bolts at 3.35c.

Cast Iron Pipe.—A good demand is still reported for small pipe, but not much business has recently been done in large diameters. Prices are held at about \$28 to \$29 per gross ton for 8-inch Pipe, at tidewater.

Finished Iron and Steel.—Bids will be opened this week for about 18,000 tons of Steel for approaches to the new East River Bridge, but the bidding on this work is restricted to those who manufacture Acid Open Hearth Steel. It will therefore not be the subject of such strong competition as would be the case if Open Hearth Basic had been specified. A good demand is reported for small lots of Structural Shapes, but nothing of special importance has been closed during the week. An inquiry is in the market for 5000 tons of Plates, to be used in the manufacture of Riveted Pipe for the extension of the service of the East Jersey Water Company. This work will require 15,000 tons in all. The general demand for Plates has been rather light. Some business has been done in Bars, but the trade has been without any particular activity. We quote at tidewater: Beams, 2.40c. to 2.50c.; Angles, 2.40c. to 2.45c.; Universal Mill Plates, 1.80c. to 1.90c.; Tees, 2.40c. to 2.45c.; Channels, 2.40c. to 2.50c. Steel Plates are 1.70c. to 1.80c. for Tank, 1.80c. to 1.90c. for Shell, 1.90c. to 2c. for Flange, 2.20c. to 2.40c. for Fire Box, and 3.50c. to 4c. for Locomotive Fire Box, on dock. Charcoal Iron Plates are held at 2.80c. for C. H. No. 1, 3.30c. for Flange, and 3.80c. for Fire Box. Refined Bars are 1.70c. to 1.80c.; Common Bars, 1.60c. to 1.70c.; Soft Steel Bars, 1.90c. to 2c., and Hoops, 2.67½c. to 2.75c., base, on dock.

Old Material.—The market for all kinds of Old Material is completely demoralized. Dealers seem to be about the only purchasers. Some of them have been badly caught by the decline in prices which has occurred since the beginning of the year. It is stated that in one case \$8 per ton was paid for a release on a considerable quantity of Old Material which the buyers decided not to add to their stock in yard.

A special dispatch to the New York Commercial says that good progress is being made in the construction of the harbor improvements at Mazatlan, Mexico, under the direction of the Federal Government. Mazatlan is one of the most important ports on the Pacific Coast, and as the Mexican International Railroad is being extended from Durango to that point, its future is considered very promising. The railroad is owned and operated by C. P. Huntington.

Metal Market.

Office of *The Iron Age*, 232-238 William street, {
New York, May 29, 1900. }

Pig Tin.—This market has been very quiet during the week under review, and although another advance was brought about in London, it had no effect on the local market. Business was so dull that the London move fell flat with purchasers on this side. The wide difference between spot and futures continues, and consequently no confidence is placed in the article. The arrivals here during the month have been large, and stocks on the first of next month will show an increase. The market closed to-day 29¼c. to 29½c. for spot, 28½c. to 29c. for June and 28c. to 28¼c. for July. London closed £136 5s. for spot and £131 5s. for futures. It will be seen that the difference between London spot and futures amounts to exactly £5.

Copper.—The market is dull and spiritless. Spot quotations have not been changed, because there is no business in immediate spot. From June on, however, the metal is freely offered at 16¼c., and it is not finding buyers above 16c. The fire in one of the Calumet & Hecla shafts is not looked upon with concern here. While it may curtail their production for a month or so, the deficiency will soon be made up. And then, the demand is not such that each little temporary curtailment of production will affect the situation. The London market has been declining during the week and reached its lowest yesterday, with £71 10s. and £70 15s. for three-months' futures. As a result of the Calumet & Hecla fire, however, the market was advanced to-day to £72 10s. for spot and £72 5s. for futures.

Pig Lead.—There has been no change. Everything is quiet and prices remain unchanged. The American Smelting & Refining Company are still quoting 4c. for spot and futures, New York, and 3.95c., St. Louis. London advanced slightly to £17.

Spelter.—After a rally of about five points the market settled back to its rather accustomed position of dullness and quietude. Very little business is doing at the moment, 4.50c. being quoted for spot and futures, New York delivery. London is quoted easier, with £21 5s.

Antimony.—There is no change to be noted, Hallett's being still quoted at 9¼c. and Cookson's 10¼c. to 11c.

Nickel.—Continues strong, but without change in price. It is still impossible to obtain large lots, and small lots demand 55c. to 60c.

Quicksilver.—Wholesale lots of 100 flasks and more are quoted at \$51 per flask of 76½ lbs. London is unchanged at £9 10s.

Tin Plate.—A good demand continues, but there is no change as to price. The American Tin Plate Company quote on a basis of \$4.84 per box of Standard 100-lb. Cokes, New York delivery, or \$4.65, f.o.b. mill.

The Cincinnati Machinery Market.

Office of *The Iron Age*, Pickering Building, {
CINCINNATI, OHIO, May 28, 1900. }

This is a quiet season in machine tool circles, at least comparatively so, but when compared with activity as it was demonstrated in 1895 the present is by no means dull. When, however, the comparison is made with 1899 then the weight of dullness seems heavy. The capacity of machine tool making shops was so very greatly increased in the past two years that a normal demand must be much ahead of all past experience to satisfy the expanded appetite for trade. Foreign trade has slackened perceptibly, and domestic has been seriously interfered with by labor troubles and the legitimate reaction from the feverish condition of a twelvemonth ago. Just now the uncertain condition of the pig iron market, together with the recent break in the manufactured product, have added other elements of uncertainty which have lightened the labors of the order clerk and sent the shop owners out into the field to drum up business. It was not very long ago that delivery was the main factor in landing buyers, and the shop that could promise a machine in three months frequently got the order on the strength of that alone. Now price is cutting quite a figure, and as in other branches, buyers are insisting that prices must come down. The majority of Cincinnati shops still have work, and not a little of it either, ahead of them, but the incoming orders are scarcely up to the capacity of production, hence it is only a matter of calculation until the number of idle machine tools will have materially increased. Within the past 60 days the number of unemployed machinists on their rounds in search of work has very largely increased. One reason for this is undoubtedly to be traced to the strike talk of

the labor unions, for when the agitation was at its height a number of shops simply dropped such men as it was thought necessary, and the conditions do not yet warrant the rehiring of them. If business picks up again additional men can easily be had; if it does not, then a boom time force is not necessary. Shops which were being run overtime are now being operated many hours less per week. Competition, which for the past 18 months or two years has been lamb-like in character, is now growing rougher, and the lion-like claws and teeth are taking the place of softness and smiles. Nevertheless, there is no sad or desperate condition existing, and it is only the expected which is happening. Trade is getting down to what is recognized as normal, and will likely continue so for more than the next few months. The prediction is freely made that 1900 will pass into history as anything but a dull year. News in machine tool circles is exceedingly scarce. Last year the new markets were explored and exploited, and new people and conditions were a thing worth mentioning; now the new has lost its interest from that cause, and has dropped into the commonplace. The world which to tool makers was largely unknown a very few years ago, and its trade unsought is now a familiarity, and the Russian, Chinese, Turk and Tartar are pigeonholed as ordinary trade takers of New York and San Francisco. The feature of trade is probably small diversified orders, and but few report sales of very great magnitude.

Greaves, Klusman & Co. are congratulating themselves on the success their heavy 16-inch engine lathes are having. The number of duplicate orders they are now receiving is the feature of their trade. Recently they delivered to the McCormick Harvester Works, in Chicago, the twelfth of their standard tools, and as the orders for these came scattered along after thorough trial of the ones previously delivered the firm think they have scored a remarkable triumph. In the same way they have just shipped their seventh lathe to Curtis & Curtis, manufacturers of pipe cutting machinery, at Bridgeport, Conn. They have also shipped at a very recent date two same size and class of lathes to the J. Morton Tool Company, Wilmington, Del. Among their very recent orders is one for 16-inch engine lathe, with 15½-foot bed and with taper attachment, this to go to a large shop on the Pacific Coast. They have just completed patterns for a 22-inch lathe, which they expect soon to put on the market. Two new planers and several other tools have just been added to their shop equipment, and now they regard themselves fully fitted out and equal to any demands competition may put upon them. They are also finding a very fair trade for their wood working machines, especially those going to pattern makers.

Wm. Schacht & Co., who manufacture screw machine specialties, and have been located in the building on the southwest corner of Third and Plum streets, have just leased the east building of the old Cook Carriage group, and have removed to it. This building is a three-story and basement stone structure, fitted with automatic fire extinguishers; it fronts 75 feet on Spring Grove avenue by 135 feet in depth. This avenue has recently been regraded and paved with asphalt, is 100 feet in width, and is one of the finest thoroughfares of this city. One of the principal products of the new shop will be turned steel handles for machine tools.

The Cincinnati Milling Machine Company have just received orders for three carloads of their tools to go to Europe; two go to England and the other to Germany.

The Blymyer Iron Works Company say that their trade with Central and South American countries is sadly hampered by the enormously high rates of exchange. A Mr. Spillard, who represents the company in Colombia, has been visiting here, and reports exchange at 2000 when he left his home a short time ago. In spite of all drawbacks, there is an excellent aggregate of trade from Spanish speaking America.

The Rahn-Mayer-Carpenter Company announce that with a new 42 x 42 x 26 planer, which they have just set up in their shops, their full equipment of tools has been completed. This gives them a capacity of two lathes per day, and at present they are finding trade reasonably good.

The Savona works of the Societa degli Alti Forni of Terni, Italy, have been purchased by a Genoa syndicate and a company have been formed with a capital of \$4,000,000 to carry on heavy engineering work and the construction of large steamers at Savona. The improvements contemplated will necessitate the purchase of a large quantity of modern tools and machinery.

The Massachusetts State Legislature recently rejected a bill defining "trusts" and providing for penalties on persons connected with them. The bill was drawn on the lines of the Ohio anti-trust law, and was made as stringent as possible.

The New York Machinery Market.

Office of *The Iron Age*, 233-235 William street, }
New York, May 29, 1900. }

Much of the interest of the street is now being directed on the various bureaus of the Government. While there are no large individual jobs under way, the aggregate is considerable. So many lines are covered by the bids just opened and under way that the interest is rather widespread. There is considerable dissatisfaction expressed here over the cutting of prices which Western machinery concerns are said to be indulging in extensively. It is said that the Hendey Machine Company of Torrington, Conn., are soon to introduce a new milling machine. The building of milling machines by the Hendey Company will be a new departure for them, and will introduce another high class machine on the market. Speaking of milling machines, we understand that since Mr. Brainard has resigned from the active management of the Becker-Brainard Milling Machine Company it has been decided to change the design of the Brainard milling machine, adding several improvements.

There is a great deal of interest shown in the doings of the General Electric Company and their allied foreign interests nowadays. This company have certainly been excellent customers in the machinery trade of late, and from present indications it would appear that they are still well worth keeping in close touch with. It will be recalled that a description of their new Schenectady machine shop was recently published in *The Iron Age*. Within the last few weeks they have done much toward adding to the heavy tool equipment of that shop. Many of the smaller machines which found space in the original layout of the shop have been relegated to other quarters, and the space which they occupied is being given up to the heavier types of machine tools. Consequently the company have been in the market for a considerable number of big tools, and are still buying. A 240-foot addition has been built to the new foundry building and suitable equipment purchased. A new forge shop has also been added to the Schenectady plant. At the Lynn, Mass., plant the General Electric Company have added a new shop for the manufacture of electrical instruments.

Work has been commenced on the foundations of the new plant of the British Thomson-Houston Company, who will operate under General Electric patents. The new plant is to be located at Rugby. A. H. Moore, who was formerly connected with the Union Electrical Works of Berlin, has been placed in charge of the work now in progress at Rugby. We are informed that the machine shop will be largely a duplicate of the one recently erected and equipped at Schenectady.

A. P. Zani and Percy Martin, representatives of the Thomson-Houston Mediterranean Company, are in this country purchasing a good sized machine shop equipment. The plant of this company is located at Milan, Italy, and will be enlarged considerably. The representatives of the company are inspecting many of our most modern shops, investigating as to the latest methods of construction and equipment. They are making their headquarters at the local offices of the General Electric Company, 40 Broad street. They intend to remain in this country until the latter part of June. Considerable machinery is being purchased by the Canadian General Electric Company. Extensive additions are being built to the Canadian shops. It was recently reported that the General Electric Company had disposed of their holdings to this company, and we have not heard a denial of the report. It is said that these holdings were acquired by a man of great influence in the Dominion.

It is said that the Lanston Monotype Machine Company are arranging for the erection of a plant at Woonsocket, R. I. This company have a five-year contract with William Sellers & Co., Limited, of Philadelphia, for the building of one machine per day.

The Berlin Iron Bridge Company of East Berlin, Conn., are said to be purchasing machinery for the equipment of a new plant which they are erecting at Economy, Pa.

A. R. Stuart of Harrisburg, Pa., is purchasing special centrifugal pumping machinery.

Two additions 75 x 100 feet are being built to the plant of the Lambert Hoisting Engine Company of Newark, N. J. Among the machinery equipment purchased is a Fifield lathe, 68 inches swing and 32 feet bed.

The Lambert Hoisting Engine Company report the sale of a 50-ton engine to the Merritt-Chapman Wrecking Company. It is to be used on a new wrecker which the company are having built. They have also received

an order for four large hoisting engines, to be shipped to Havana.

E. S. Ward & Co. are building a new tanning plant on Frelinghuysen avenue, Newark, N. J. The main building is 400 x 52 feet, the japan shop is 170 x 68 feet and the power house 100 x 22 feet. They have purchased two 125 horse-power boilers from the Coatesville Boiler Works of Coatesville, Pa., and 141 Broadway, and a Hewes & Phillips engine.

We are informed that the Singer Mfg. Company have recently purchased a large number of machine tools for installation in their new addition, at Elizabethport, N. J. They have not, however, purchased fully to the extent of their requirements, and will soon be in the market for the balance. L. B. Miller is superintendent of the works.

The New York Air Compressor Company of 95 Liberty street have received an order from the Navy Department for a 300-foot compressor, to be installed at the Pensacola, Fla., naval station. The compressor will be electrically driven.

An order for a 500 horse-power boiler plant has been awarded to the Heine Safety Boiler Company of 11 Broadway and St. Louis by Takata & Co. of 10 Wall street. The plant is to be installed in the new power station of the Yokohama Electric Light Company. The Heine Company have also been awarded a contract for an equipment for the Ponce Electric Light Company of Ponce, Porto Rico.

It is reported that the Department of Charities and Hospitals of Havana is soliciting a complete line of catalogues of building materials, heating, ventilating and power generating apparatus, &c., as they anticipate purchasing quite heavily in the near future. R. Addesperger has been appointed supervising architect for the department and will be in charge of the construction and equipment.

The Whitman Mfg. Company of 39 Cortlandt street, and Garwood, N. J., are now appointing agents for their new B. and C. friction gas engine and line shafting clutches. The Machinery & Electrical Company of Los Angeles, Cal., have received the agency for the Pacific Coast, and the Willamette Iron Works of Portland, Ore., have been appointed agents for the Northwest.

Westinghouse, Church, Kerr & Co. of 26 Cortlandt street have sold to the American Rolling Mill Company of Cincinnati a 1000 horse-power equipment of Roney mechanical stokers to be installed in their Middletown, Ohio, plant. The Westinghouse Company have also received an order for a 160 horse-power compound condensing engine to be shipped to Barcelona, Spain. They have received from the Park Steel Company an order for 1200 horse-power Roney stokers, and were awarded another contract for a 2500 horse-power vertical compound engine from the Metropolitan Electric Power & Supply Company of Willesden, England. This is the fifth engine of this type that this company have ordered from the American concern. Other orders received by Westinghouse, Church, Kerr & Co. include Holly Gravity Return systems for the Electric Power & Light Company of Syracuse, N. Y., the Buffalo Cotton Mills of Union, S. C., and Carman Thompson Company of Lewiston, Maine.

Gould & Eberhardt of Newark, N. J., have just been awarded contracts from the Government for a 90-inch gear cutting machine to be installed in the League Island Navy Yard, a gear cutter for the Mare Island station, a drill press for the Naval Training School at Newport, R. I., and three steel plate transfer presses to be used by the Bureau of Engraving and Printing at Washington.

Sealed proposals will be opened at the Bureau of Supplies and Accounts, Navy Department, on June 5 for a quantity of machine tools to be furnished to the Boston Navy Yard. Proposals will also be received by this department until June 19 for a quantity of machine tools for the naval station at Puget Sound, Wash. Proposal blanks for this work can be secured from A. S. Kenny, Paymaster-General U. S. Navy.

Following are some of the bids recently received for machinery and supplies:

New York Navy Yard.

- Bidder 1. Thresher Electric Company, Dayton, Ohio.
2. A. S. Farr, 204 East Lexington street, Baltimore.
3. Pettit Reed, 13 Harrison street, New York City.
4. Ledyard Avery, 291 Greenwich street, New York City.
5. Armour & Co., Chicago.
6. Simpson, McIntyre & Co., 27 South Market street, Boston.
7. F. J. Dessoir, 56 Hudson street, New York City.
8. S. W. Seaman, New York City.
9. F. W. Hannahs, 866 Broad street, Newark, N. J.
10. New Jersey Foundry & Machine Company, New York City.
11. Bement, Miles & Co., Philadelphia, Pa.
12. The Niles Tool Works Company, Hamilton, Ohio.

13. Sprague Electric Company, 527 West Twenty-fourth street, New York City.

14. Manning, Maxwell & Moore, 85 Liberty street, New York City.

15. Williams, White & Co., Moline, Ill.

16. General Electric Company, Schenectady, N. Y.

17. Jas. F. Oyster, Washington, D. C.

Class 1. One electrically operated No. 6 punching machine—Bidder 12, \$2460; 14, \$3375; 15, \$3700; 11, \$8650.

Class 2. One electrically operated No. 4 double angle shears—Bidder 11, \$3650; 12, \$3975; 14, \$5500.

Class 3. Direct connected type motors—Bidder 1, \$8670; 2, \$9208.50; 13, \$10,390; 10, \$11,078; 16, \$14,856.

Class 4. 60,000 pounds butter—Bidder 4, \$15,240; 9, \$15,390; 5, \$15,500; 3, \$15,525; 7, \$15,978; 17, \$16,080; 6, \$17,022; 8, \$17,328.

League Island.

Bidder 1. New Jersey Foundry & Machine Company, 26 Cortlandt street, New York City.

2. Industrial Works, Bay City, Mich.

Class 1. One locomotive crane—Bidder 1, \$5390; 2, \$5400.

Ellis Island.

Bids opened by the Supervising Architect for the installation of engines and generators for the United States immigrant station, at Ellis Island, N. Y., were as follows:

Ridgway Dynamo & Engine Company, Ridgway, Pa., \$19,390.

Thresher Electric Company, Dayton, Ohio, \$28,838 for vertical engines and \$28,138 for horizontal engines.

The United Engineering Company, New York City, \$23,734.

Westinghouse, Church, Kerr & Co., New York City, \$28,673.

Heating and Ventilating.

Philadelphia Steam Heating Company, Philadelphia, Pa., \$22,970; for power boilers add \$1630 (Babcock & Wilcox).

Gillis & Geohegan, 537 West Broadway, New York City, \$21,000; for power boilers add \$3000.

Blake & Williams, 362 West Broadway, New York City, \$16,565; for power boilers add \$3245 (Babcock & Wilcox or Heine).

Baldwin Engineering Company, 107 West Seventeenth street, New York City, \$19,780; for power boilers add \$1720.

David R. Burns, 739 North Nineteenth street, Philadelphia, Pa., \$23,946; for power boilers add \$4000 (Babcock & Wilcox).

Crook, Horner & Co., 301 North Howard street, Baltimore, Md., \$20,220; for power boilers add \$2584 (Heine).

Proposals were opened to-day at the Bureau of Supplies and Accounts, Navy Department, Washington, D. C., for the following, to be installed at the Pensacola, Fla., naval station:

One 1½-inch riveting and bolt heading machine, one 350-pound single frame steam hammer, one 800-pound single frame steam hammer, two 3-ton jib cranes, and a quantity of machine bolts, screws and washers.

(By Telegraph.)

The Navy Department to-day opened bids for machine tools for the New York Navy Yard, as follows:

Bidder 1, Edward W. Irwin; 2, Francis H. Stillman; 3, S. A. Woods Machine Company; 4, Rand Drill Company; 5, Manning, Maxwell & Moore; 6, Sprague Electric Company; 7, New York Air Compressor Company; 8, George Place; 9, William Sellers & Co.; 10, Alfred H. Thresher; 11, Bullock Electric Company; 12, Hill, Clark & Co.; 13, Riehle & Bros. Testing Machine Company; 14, Brown & Sharp Mfg. Company; 15, Standard Pneumatic Tool Company; 16, General Electric Company; 17, Dietrich & Harvey Machine Company; 18, Doyler Engineering Company; 19, Niles Tool Works Company; 20, Fairbanks Company; 21, Stanley & Patterson; 22, W. F. Foster; 23, Manhattan Supply Company; 24, Bement, Miles & Co.; 25, U. Baird Machine Company; 26, Westinghouse Electric & Mfg. Company; 27, Garvey Machine Company; 28, Gould & Eberhardt; 29, Ferracute Machine Company; 30, Pratt & Whitney Company; 31, Philadelphia Machine Tool Company; 32, Crocker-Wheeler Company.

The tools on which bids were received, and the bids made, are as follows:

Class 1. One crank shaft and engine lathe—Bidder 24, \$25,400.

Class 2. One 120-inch planing machine—Bidder 5, A, \$13,700; B, \$14,300; C, \$19,500; D, \$18,880; 17, \$12,645; 19, A, \$15,420; B, \$14,600; 24, \$14,600.

Class 3. One bar shear—Bidder 5, A, \$945; B, \$1215; 19, \$1100; 25, \$1160; 29, \$1222; 30, \$1075.

Class 4. One 90-inch gear cutting machine—Bidder 5,

A, \$4240; B, \$4640; 25, \$4240; 28, A, \$4340; B, \$4740; 30, \$4660.

Class 5. One 18-inch automatic gear cutting machine—Bidder 5, A, \$1055; B, \$895; 14, \$1113; 25, \$1078; 28, A, \$1150; B, \$1195.

Class 6. One 36-inch automatic gear planer. No bid.

Class 7. One 6-inch pipe threading and cutting machine—Bidder 5, A, \$862; B, \$387; 19, \$750; 20, \$240; 23, \$980; 25, \$653.50; 30, \$840.

Class 8. One 4-inch pipe threading and cutting machine—Bidder 5, A, \$506; B, \$140; 19, \$490; 20, A, \$156; B, \$440; 23, \$578; 25, \$432.50; 30, \$525.

Class 9. One power sprue cutter—Bidder 19, \$945; 20, \$494; 25, \$500; 29, \$525; 30, \$530.

Class 10. One universal grinding machine—Bidder 5, \$1677; 14, \$1686.50; 22, \$1520; 25, \$1686.

Class 11. One surface grinding machine—Bidder 5, \$732; 14, \$726.75; 23, \$724; 25, \$726.75; 30, \$740.

Class 12. One 125-ton hydraulic bar straightening press—Bidder 2, \$600.

Class 13. One cutting off machine—Bidder 5, \$474; 12, \$464; 19, \$479; 22, \$502; 27, \$484; 30, \$725.

Class 14. One Duplex air compressor—Bidder 1, \$7200; 4, \$8023; 7, \$6400.

Class 15. Twenty-one straight lift pneumatic hoists—Bidder 1, \$1002; 4, \$946.50; 5, \$990; 7, \$1039.50; 15, \$1192.17; 19, \$1060.50; 22, A, \$877.20; B, \$757; 25, \$1186.80; 30, \$1059.

Class 16. Twenty-eight pneumatic tools—Bidder 1, \$2899; 5, \$2860; 7, \$2878; 15, \$3445; 19, \$2932; 25, \$3814.896; 30, \$2924.50.

Class 17. One testing machine—Bidder 13, \$2150; 31, \$1800.

Class 18. One four-roll single surfer—Bidder 3, \$490; 5, \$485; 8, \$545; 19, \$620; 30, \$480.

Class 19. One 200 k. w. direct current generator, engine type—Bidder 6, \$4000; 10, \$3350; 11, \$3415; 16, A, \$4350; B, \$3500; 18, \$3840; 21, \$4274; 26, \$6687; 32, \$3750.

Andrew Harper, formerly with W. J. Carlin Company, is now with Grant & Williams, Park Row Building.

Trial of Parsons Steam Turbine Marine Engine.

The Government test of the British torpedo boat destroyer, "Viper," which had been looked forward to with considerable interest in the engineering world for some time past, was successfully carried out recently at Portsmouth, England. The vessel had been fitted with the Parsons steam turbine, and it was felt that the value of the system would be crucially tested by this Government trial. The "Viper" was taken out, and steamed up the coast to the measured mile and commenced her trial runs rather before the full power had been worked up. Rejecting the first runs and taking the following six, it was found that the speed was just 3¼ knots. The best pair of runs gave 34.67 knots. It should be stated that the boat had been in the water some time waiting for her trials, and with a "scrubbed" bottom would undoubtedly have done better. The wind and rough water were also against high speed. The mean revolutions on the mile were about 1050, and the steam pressure ranged from 165 pounds to 175 pounds. Unfortunately the relief valves were set rather light and a great quantity of steam escaped when the pressure was allowed to run up. The contract load was 40 tons, but 60 tons were actually carried. The displacement at trial draft was 370 tons. As the steam turbine cannot be reversed there is a separate one for going astern, the speed in that direction being about 15½ knots.

The International Compress Company is the title of a new corporation chartered under New Jersey laws, with a capital of \$100,000, to manufacture compressed fuel from coal under patents owned by the company. W. W. Gibbs of Philadelphia is the most prominent promoter, and the same interests that are identified with the Marsden Cellulose, International Smokeless Powder and Anglo-American Rapid Vehicle companies are also connected with the new enterprise.

F. E. Satterlee Company, Minneapolis, Minn., dealers in new and second-hand wood working machinery and supplies, are adding iron working machinery, tools and supplies to their line, and desire catalogues.

Kaufmann & Stengel, Philadelphia, Pa., agents for the Crescent Steel Company's product of tool steel, drill rods, &c., have established a branch office in Buffalo, N. Y., at 22 Ellicott street, A. B. Day, Jr., manager, where a full line of goods will be carried in stock.

QUOTATIONS OF IRON STOCKS DURING THE WEEK ENDING MAY 30, 1900.

Cap'l Issued.		Sales.	Thursday.	Friday.	Saturday.	Monday.	Tuesday.	Wednesday.
\$29,000,000	Am. Car & Foundry, Common...	3,520	16½-17	16½-17	16½-16¾	16¾-16¾	16¾-17	.....
29,000,000	Am. Car & F'y, Pref. (7½ Non-Cu.)	1,575	65 -65½	-65½	.....	65 -65½	64½-65	.....
19,000,000	Am. Steel Hoop, Common.....	3,585	20½-21¼	20½-20½	.....	20 -20½	21½-22¾	.....
14,000,000	Am. Steel Hoop, Pref. (7½ Cu.)...	1,178	68½-69½	-69½	-70	70 -70½	70 -70½	.....
50,000,000	Am. S. & W., Common.....	36,835	33¾-35	33 -34½	34½-34½	34 -34½	34½-35¼	.....
40,000,000	Am. S. & W., Pref. (7½ Cu.).....	8,267	73 -74	73½-74½	73½-74	-73¾	73½-75	.....
28,000,000	Am. Tin Plate, Common, N. Y....	1,740	22½-22¾	.....	-22¾	21¾-22½	22 -22½	.....
18,325,000	Am. Tin Plate, Pref., N. Y. (7½ Cu.)	635	-75	.....	-74	-72¾	-73½	.....
7,500,000	Bethlehem Iron.....	300	.....	57½-57¾	.....	.....	.....	.....
15,000,000	Beth. Steel, Par \$50, \$1 paid in....	1,235	-14	13½-13½	13½-14	-14	-14	.....
7,974,550	Cambria Iron, Phila*.....	135	-44½	44 -44½	.....	.....	.....	.....
16,000,000	Cambria Steel**.....	1,518	17½-18	17¾-17¾	.....	17¾-18	-18	.....
11,000,000	Col. Fuel and Iron.....	1,290	35½-36½	-36	.....	-35½	36 -36½	.....
46,484,300	Federal Steel, Common.....	39,215	33 -35	33 -34½	33¾-34½	33¾-34½	34½-35	.....
53,253,500	Federal Steel, Pref. (6½ Non-Cu.)	4,140	65¾-66½	-66½	66¾ 67	67½-68	67½-68	.....
32,000,000	National Steel, Common, N. Y....	2,980	28½-30½	28½-29	-28½	28½-29	-29½	.....
27,000,000	Nat'l Steel, Pref., N. Y. (7½ Cu.)	283	-87	.....	.....	.....	-87	.....
40,000,000	National Tube, Common, N. Y....	5,405	43 -45	43 -44½	43¾-44½	44 -44½	44½-44½	.....
40,000,000	National Tube, Pref., N. Y....	791	-88	.....	-88½	.....	-88½	.....
5,000,000	Penna., Common, Phila.....	.....	.....	.....	.....	.....	.....	.....
1,500,000	Penna., Pref., Phila.....	300	.....	.....	.....	.....	-85	.....
12,500,000	Pressed Steel, Common.....	1,670	43 -45½	43½-44	-43¾	44 -44½	43 -44	.....
12,500,000	Pressed Steel, Pref. (7½ Non-Cu.)	260	-77¾	.....	.....	-77	.....	.....
27,352,000	Republic Iron & Steel, Common...	4,175	14 -14½	13¾-13¾	13¾-14	12 -13½	12½-13½	.....
20,852,000	Repub. Iron & Steel, Pref. (7½ Cu.)	1,300	-56½	.....	-56½	55 -56¾	56½-57	.....
20,000,000	Tennessee Coal and Iron.....	16,765	72 -75¾	70¾-72¾	71¾-72½	71¾-72	72¾-74	.....
1,500,000	Warwick Iron & Steel (par \$10)...	400	-8½	-8½	.....	-8½	8¾-8½	.....

* Par \$50. ** \$9 per share paid in. † 6% guaranteed by Beth. Steel Co. Late Philadelphia sales by telegraph. ‡ Ex-dividend.

Bonded indebtedness: Am. S. & W., \$130,656; Am. Tin Plate, none; Am. Steel Hoop, none; Cambria Iron Co., \$2,000,000 6% debenture 20-year bonds, 1917, payable option 5 years, assumed by Cambria Steel Co.; Federal Steel Co., \$13,300,000 Illinois 5%, \$7,417,000 E. J. E. R. R. 5%, \$1,600,000 Johnson 6%, \$6,732,000 D. & I. R. R. 5%, \$1,000,000 2d D. & I. R. R. 6%, \$10,000 land grant D. & I. R. R. 5%; National Steel, \$2,561,000 6%; National Tube, none; Tennessee C. I. & R. Co., \$3,367,000 6%, \$1,114,000 7%, \$1,000,000 7% cu. pref.; Pennsylvania Steel, \$1,000,000 5%, Steelton, 1st, 1917, \$2,000,000 5%; Sparrow's Point, 1st, 1922, \$4,000,000, consolidated, both plants; Bethlehem Iron, \$1,351,000 5% maturing 1907. Interest and principal guaranteed by Bethlehem Steel Co. Republic Iron & Steel, none; Warwick Iron & Steel, none; Colorado Fuel & Iron Co.; Col. Fuel Co. Gen. Mort. 6% \$880,000, Col. Coal & Iron Con. Mort. 6% \$2,810,000, Col. Fuel & Iron Gen. Mort. 5% \$2,383,000. Also outstanding \$2,000,000 preferred stock with accumulated dividends of \$640,000 to June 30, 1899.

Iron and Industrial Stocks.

Transactions in the iron and steel stocks have been rather light during the past week, with a comparatively narrow range of prices. The interest in the stock market as a whole was somewhat languid, neither bulls nor bears operating to any marked extent.

	Bid.	Asked.
American Bicycle Company, common.....	8¾	9¼
American Bicycle Company, preferred.....	35	40
American Bicycle Company, bonds.....	80	80
E. W. Bliss, common.....	137½	137½
E. W. Bliss, preferred.....	125	127
Cramp's Shipyard stock.....	70	75
Diamond State Steel.....	3¾	4
International Silver, common.....	5	6
International Pump, common.....	17	17½
International Pump, preferred.....	62	64
Otis Elevator, common.....	29¾	30
Otis Elevator, preferred.....	86	88
Pratt & Whitney, common.....	3½	5
Pratt & Whitney, preferred.....	42	52
U. S. Projectile.....	95	100
Sloss & Sheffield Steel & Iron, common.....	18	22
Sloss & Sheffield Steel & Iron, preferred.....	61	64
Tidewater Steel.....	11¾	12
U. S. Cast Iron Pipe Company, common.....	6	6¾
U. S. Cast Iron Pipe Company, preferred.....	40¾	42
H. R. Worthington, preferred.....	110	110
Empire Steel, common.....	20	20
Empire Steel, preferred.....	60	60

The Tennessee Coal, Iron & Railroad Company's net earnings for April were \$289,400, an increase of \$201,930 as compared with the same month last year. From January 1 to April 30 the net surplus is \$1,054,080 and the increase \$934,520.

The Republic Iron & Steel Company have declared the fourth quarterly dividend of 1½ per cent. on the preferred stock, payable July 2. President Warner made a verbal statement to the board of the results of the business of the company to May 1. The results shown more than bear out the statement that Mr. Warner made to the press some days ago that the surplus on May 1, after paying all dividends on the preferred stock and marking off nearly \$500,000 for decline in the value of stock on hand, would be more than \$3,000,000. Mr. Warner also reported to the board that the company had no bills payable and no outstanding indebtedness of any kind, but current pay rolls and accounts.

The American Steel Hoop Company held their annual meeting at Orange, N. J., on the 29th inst. The retiring directors were all re-elected and the entire list of officers was re-elected. C. A. Painter, first vice-president, voluntarily retired to engage in other business, but remains a director. The meeting was perfectly harmonious. The following statement of the condition of the company on April 30 was presented:

Assets.	
Plants, real estate and machinery.....	\$30,000,000.00
Improvements during year.....	426,350.02

Ore and coal properties purchased during year.....	611,428.00
Merchandise inventory at cost.....	3,387,439.42
Accounts receivable.....	2,291,000.76
Bills receivable.....	180,156.51
Cash.....	1,276,176.85
Total.....	\$8,172,605.56

Liabilities.

Capital stock—Preferred.....	\$14,000,000
Common.....	10,000,800
Accounts payable.....	\$33,000,000.00
Surplus for year.....	1,125,709.11
Less 7 per cent. dividend on preferred stock for year.....	980,000.00
.....	4,046,896.45

Total.....\$8,172,605.56

The directors at their meeting after the stockholders' meeting charged off \$1,000,000 for depreciation, leaving the net surplus \$3,046,896.45.

The Proposed Coke Consolidation.

As noted last week, a movement is under way to consolidate several coke companies independent of the H. C. Frick Coke Company. Options on the different works are being secured by William Jamison of the Latrobe Coal Company. The promoter has obtained purchase papers on a number of plants, while other firms are yet to be seen. The proposed capitalization is reported to be as high as \$25,000,000.

Among the concerns which it is desired to secure are the Hostetter-Connellsville Coke Company, Bessemer Coke Company, Derry Coal & Coke Company, Washington Coal & Coke Company, Duquesne Coal & Coke Company, Empire Coal & Coke Company, Monastery Coke Company, Standard Coke Company and W. J. Rainey & Co. The proposed capitalization as rumored includes the Rainey Company, although it is not known whether that interest will consider the proposition. If not the combine will likely be effected without the Rainey Works. The companies on which options are sought are those which are not allied to the big steel and iron combinations.

At the foundry of the Gorham Mfg. Company, Providence, R. I., a statue is soon to be cast in bronze of heroic size of Brig.-Gen. Griffin A. Stedman, Jr., of Connecticut, who was killed in battle before Petersburg in the Civil War. The plaster cast by Sculptor Fred Moynihan of New York City has just arrived at the above named company's works. The statue when completed will be mounted in a commanding position at the intersection of six streets at Camp Field, Hartford.

OBITUARY.

JAMES ERNEST SCHWARTZ.

James E. Schwartz, one of the most widely known and popular business men of Pittsburgh, Pa., died at the Hotel Bellevue, Dresden, Germany, on the 16th inst. Mr. Schwartz's health began to fail a year or more ago. A European trip was advised by his physicians, and accordingly last November he sailed for the Continent.

James Ernest Schwartz was born in Allegheny, Pa., in 1843. He was a son of Jacob L. Schwartz, a leading business man of his day in the twin cities, and member of the lead manufacturing firm of Fahnestock, Schwartz & Hazlett. The deceased received his business training with his father in the lead business, and after the latter's death and the dissolving of the old firm, went into the business himself. In later years he left the white lead branch and began the manufacture of pig lead, which he carried on for many years. He was active also in other branches of business, and energetically applied himself to his various interests up to the time illness overtook him. At the time of his death he was president of the Pennsylvania Smelting Company of Utah, president of the Pennsylvania Lead Company of Pittsburgh, and had been for some years a director of the Bank of Pittsburgh. From early years he was connected with the Third Presbyterian Church, and was a member of that congregation at the time of his death. He was also a member of the Duquesne Club, and lent a genial spirit toward the success of its numerous social enterprises.

The beginning of the Civil War found James E. Schwartz still a very young man, in fact, yet in his teens. He was early in the struggle, however, and received a commission as a lieutenant in the Twenty-second United States Infantry. Later he was transferred to the famous Knap's Battery, and engaged in some of the hottest fighting of the war with that organization.

He leaves two sons, F. N. and J. L. Schwartz, and a widow. One of his sisters is the wife of George S. Griscom, well known in the iron trade.

H. O. CASE.

H. O. Case, who died at his son's home in Westfield, Mass., on May 8, will be remembered by the hardware trade as representing for a long time the H. & B. cutlery and bright wire goods. Mr. Case also for a time represented the Northfield Knife Company's goods as a side line, his regular line then being whips. In his earlier days he manufactured whips under the name of A. C. Barnes & Co., at the same time keeping to the road until his, with other companies, were consolidated in the United States Whip Company, whom he represented as traveling salesman, remaining with them five years. After leaving that concern he became connected with the Independent Whip Company, whom he represented at the time of his death. As a traveling man for 30 odd years Mr. Case was well and favorably known. He was also a stockholder and director of the Geo. A. Weaver Company of Newport, R. I.

R. LLOYD LEE.

R. Lloyd Lee, assistant treasurer of the Phoenix Iron Company of Phoenixville, Pa., died on May 24 at his home in Germantown, Pa., after an illness of several weeks' duration. Mr. Lee, who was 72 years of age, was born in Halifax, Nova Scotia, but went to New York City at the age of 20 years. In 1852 he went to Philadelphia and entered the employ of the Phoenix Iron Company, of whom he had been the assistant treasurer for the past ten years.

EDWARD D. STEELE.

Edward D. Steele, vice-president and treasurer of the Waterbury Brass Company, died on May 23 at his home in Waterbury, Conn., aged 62. He was born at Lima, N. Y., and began a long and successful business career in Waterbury when a young man. Besides his connection with the Waterbury Brass Company, Mr. Steele was identified with several of the city's leading industries. He served in the Connecticut State Senate in 1897.

JOHN FULLERTON.

John Fullerton, a well-known brass founder of Philadelphia, died on May 27 at his home in that city, aged 74 years. Mr. Fullerton was the head of the Fullerton Rolling Mill Company, with a brass foundry and smelting works at 38 East Girard avenue, Philadelphia, and was also president of the Altoona Iron Company of Altoona, Pa.

The Wheeling Bridge & Terminal Railway, at Wheeling, W. Va., was sold last week to bankers in New York City for \$1,515,000. It is said that these bankers represented the Pennsylvania Railroad, who are the real purchasers.

PERSONAL.

W. R. Weston, assistant sales agent for the Carnegie Steel Company, at St. Louis, has been appointed manager of the Mexican office of the company, located at Calle de San Francisco, No. 8, City of Mexico. His territory includes the entire republic. Mr. Weston, who has been connected with the St. Louis office of the Carnegie Steel Company for 12 years, left for his new field on May 27.

R. D. Carver has been appointed general sales agent of the Alabama Steel & Wire Company, Birmingham, Ala. For a number of years he was secretary of the Cincinnati Barb Fence Company, and when that company were absorbed by the American Steel & Wire Company, became attached to the sales department at Chicago. His headquarters will be at Birmingham.

Andrew Carnegie, now in Scotland, has notified the Board of Trustees of Carnegie Institute, at Pittsburgh, to go ahead with the plans for enlargement of that institution, and has also given the trustees assurance that if \$3,600,000 is not enough to complete the work, more money will be donated.

C. M. Schwab, president of the Carnegie Steel Company, who has been in Europe for some weeks, has arrived in this country. Mr. Schwab has purchased the fine residence of the late Capt. J. J. Vandergrift, at Pittsburgh, and will occupy it at an early date.

Lawrence C. Phipps, treasurer of the Carnegie Steel Company, will sail for Europe early in June. Mr. Phipps has bought the S. Jarvis Adams residence in Shady Side, Pittsburgh, containing about 7 acres, and will build a handsome residence for himself.

Chas. W. Friend, of the Clinton Furnace of the Clinton Iron & Steel Company of Pittsburgh, and W. H. Parke, secretary of the Logan-Gregg Hardware Company, at Pittsburgh, sailed for Europe on Saturday, May 26.

Charles H. Morgan, president of the American Society of Mechanical Engineers, sailed for Europe May 24 on the North German Liner "Grosser Kurfurst." Mr. Morgan will probably return in August.

W. I. Babcock, president and general manager of the Chicago Shipbuilding Company, has resigned, and on July 1 he will sever his connection with lake shipbuilding interests.

Fourth Vice-President Philip W. Moen of the American Steel & Wire Company, Worcester, Mass., is about to start on a five months' European tour.

The Merchants' Association of New York complimented their president, William F. King, with a dinner at the Hotel Waldorf-Astoria on Friday evening, the 25th inst. The dinner was a testimonial to him personally for his work as president of the association. Governor Roosevelt was among the speakers, together with Comptroller Bird S. Coler of the city of New York and quite a number of other prominent persons.

Herm. Weissenburger & Co., Cannstatt, Germany, advise us that they control a number of patented processes covering cold plating on aluminum, hot dipping of tin and lead on the same metal, a solder fluid that enables soldering with pure tin, a rust proof plating on iron, a plating process without electricity, &c. They invite Americans visiting the Paris Exposition to communicate with them.

All the larger railroad systems operating out of Chicago have begun to serve notice on connecting lines that after August 1 they will refuse to accept cars that are not equipped with automatic couplers according to law. It is estimated that 90 per cent. of the railroad rolling stock of the United States is now equipped with the automatic couplers.

John I. Green, at one time the owner of the Big Stone Gap Iron Company, Virginia, has begun suit against the Union Steel & Chain Company, New York, to have his property returned to him, alleging incorrect representations. It is said that the suit is a test case and that if it is successful others will be brought against the same company to have property returned to original owners.

The Canton Crucible Steel Company have been incorporated at Canton, Ohio, with a capital of \$15,000. The company will make tube drawing tools, taps, edge tools, plow shares, lathe tools, dies, shear blades and steel castings.

Statistics of American Iron and Steel Production.

We have just received the annual statistical report covering the year 1899 issued by James M. Swank, general manager of the American Iron & Steel Association, Philadelphia. The appearance of this report each year is one of the events to which the trade looks forward with great interest. It is an authentic presentation of the results accomplished by our manufacturers of iron and steel. These reports as prepared by Mr. Swank give the statistics of production in the United States with a fullness that is unapproached by the statistical authorities of any other country. It is a matter of pride that the trade in this country is kept so thoroughly posted in the progress annually being made.

The report is preceded by a carefully written review of the conditions governing the trade during the past year. The review in this report is particularly important, as it covers a year of such extraordinary activity. It discusses the course of prices in a general way, points out the special influences which caused the great increase in business and calls attention to special matters having a direct bearing on the condition of trade, which are worthy of preservation historically. The conditions abroad have not been lost sight of, but are also carefully reviewed in order to throw a side light on the domestic situation. The exports and imports receive attention. The increased uses of iron and steel are enumerated not only as contributing to the very heavy demand for iron and steel in the past, but in their bearing upon the future.

No attempt will be made here to traverse the array of figures presented by the report, but a table is given as follows, showing the production of leading articles of iron and steel as well as coke in 1899 as compared with 1898:

Articles.—Gross tons, except coke and nails.	1898.	1899.
Shipments of—		
Iron ore from Lake Superior.....	14,024,673	18,251,804
Connellsville coke, in net tons.....	8,460,112	10,129,764
Production of—		
Pig iron, including spiegel and ferro.....	11,773,934	13,620,703
Spiegeleisen and ferro-manganese.....	213,769	219,768
Bessemer steel ingots and castings.....	6,609,017	7,586,354
Open hearth steel ingots and castings.....	2,230,292	2,947,316
All kinds of steel.....	8,932,857	10,639,857
Structural Shapes, not including plates.....	702,197	906,277
Plates and sheets, except nail plate.....	1,448,301	1,903,505
All rolled iron and steel, except rails.....	6,532,129	8,084,697
Bessemer steel rails.....	1,976,702	2,270,585
All kinds of rails.....	1,981,241	2,272,700
Street rails, included above.....	143,815	154,246
Iron and steel wire rods.....	1,071,683	1,099,378
All rolled iron and steel, including rails.....	8,513,370	10,357,397
Iron and steel cut nails, in kegs.....	1,572,221	1,904,340
Iron and steel wire nails, in kegs.....	7,418,475	7,599,522

The Cosey Steel Casting Company, at Mount Vernon, Ohio, have placed an order with Edward E. Erikson, engineer and contractor, Garrison Building, Pittsburgh, for the erection of two open hearth furnaces for their new steel casting plant at Mount Vernon, Ohio.

Jones & Laughlins, Limited, of Pittsburgh have placed a contract for the building of 25 barges, to be used for transporting coal from their mines up the Monongahela River to their American Iron & Steel Works on the South Side, Pittsburgh.

The United States Cast Iron Pipe Company are shipping from their plant at Bessemer, Ala., a large quantity of 36-inch and 42-inch piping to the City of Mexico to be used in the new sanitary system that is being installed there.

A lease on newly discovered coal fields, near Puebla, Mexico, which was secured about a year ago by the Cheesewright & Furber Company, a strong English corporation, is reported to have turned out an unexpectedly profitable investment for the lessees. Experts have just made their report to the company, stating that the coal deposits are in inexhaustible quantity and of excellent quality. The discovery is of great importance to the industrial interests of Mexico, as their present coal supply comes from the United States and Europe, and commands very high prices.

A Philadelphia syndicate have purchased the entire town of Frugality, Cambria County, Pa., for \$1,000,000. Included in the details are 10,000 acres of coal lands and extensive mining operations in the town of Frugality. The purchase includes 150 houses, a large department store, two churches, three schools, a large hotel and a town hall. The new company, it is said, will spend considerable money on enlargements to mining and coke making plants. This is the first case in Central Pennsylvania where a whole town, including churches and schools, changed ownership in a day.

Manufacturers' Protective Association.

An organization has been formed by a number of American manufacturers to protect and secure manufacturers and others against fraudulent and irresponsible advertising agents, syndicate travelers and representatives of fraudulent concerns, and to establish a bureau of information respecting these matters. They supply the services of legal counsel in defense of their patrons against claims arising from the misconduct of such agents, fraudulent concerns, &c., and generally conduct and carry on the business of procuring and supplying information to their members of the financial and business standing of new enterprises, both domestic and foreign.

A pamphlet issued by the association, which has just been received, goes quite fully into the objects of the association, and sets forth the practices from which manufacturers have suffered and against which it is proposed through this association to protect them. The membership fee is \$25 per year, which covers all claims and liabilities on account of the association. The directors are as follows: Charles T. Stork, secretary of Van Wagoner & Williams Hardware Company; John T. Hemenway of Smith & Hemenway Company; Adolf Juenger, treasurer of the New York Asbestos Mfg. Company; E. F. Wolff, exporter. The officers are as follows: E. F. Wolff, president and treasurer; Charles T. Stork, first vice-president; John T. Hemenway, second vice-president; Adolf Juenger, secretary. The office is in the Park Row Building, New York.

A New Abrasive Enterprise.—The National Abrasive Mfg. Company of Philadelphia, chartered under the laws of New Jersey, own extensive corundum, kaolin, talc, copper, mica and chromic iron properties, comprising 22,000 acres in Jackson, Macon and Haywood counties, N. C. It is the purpose of the company to thoroughly develop this property, the estimated value of which is from \$6,000,000 to \$10,000,000, in addition to an extensive timber tract, comprising over 200,000,000 feet, which is under contract to be cut, the company deriving a large revenue from mills already erected on the land. It is claimed that the corundum found on the company's property is the purest sapphire corundum ever produced in this country. It is also said that owing to the several varieties of corundum, differing in color and hardness, found on the property, it is possible to produce from these mines every grade that may be required. The office of the company is located in the Drexel Building, Philadelphia.

Justice Harlan, in the Supreme Court of the United States, recently handed down the opinion of the court in the case of a New Orleans importer, involving a determination of what constitutes an "original package" of imported goods. The court held that original packages were boxes or cases of goods and not the parcels enclosed in the boxes or cases.

Letters of Incorporation have been granted at Toronto, Canada, to the Cramp (Ontario) Steel Company, Limited. The capital stock is placed at \$5,000,000, divided into shares of \$100 each. Among the incorporators are Charles D. Cramp and Wm. M. Cramp, late of William Cramp & Sons Shipbuilding Company of Philadelphia.

The recent developments in South Africa, pointing to an approaching cessation of the war, have caused American merchants and manufacturers to begin preparations for the renewal of business with the Transvaal and the Orange Free State. Some large lots of mining machinery, pipes, and other heavy goods, ordered before hostilities began, have been awaiting shipment in this country for some time. These will probably be shipped before long, and it is likely that a large demand for our manufactured products will spring up as soon as peace is assured.

Preparations are being made for an important exposition to be held at Düsseldorf, in Rhenish Prussia, in 1902. The title of the enterprise is the Industrial and Commercial Exhibition of Rhenish Westphalia. Its area is to be not less than 450,000 square yards, of which 126,500 will be covered by buildings. All the numerous industries of the rich mining district of Western Prussia will be fully represented, and Herr Krupp will have an important exhibit. The whole of the space allotted to the display of machinery, 14,500 square yards, has already been disposed of, so that an extension of the original plans for this department will be necessary. The exposition will afford a valuable opportunity for studying in detail the advances made in recent years by the large German industries, especially in the iron trade.

HARDWARE.

Condition of Trade.

THERE continues to be a fair movement of goods from jobbers to retailers, and, considering the general condition of the market, prices are, on the whole, pretty well maintained. There is naturally more or less cutting and some irregularity thus results, while in certain lines in which there have been open declines, as, for example, Carriage Bolts and Wrought Pipe, the market is rather demoralized, but the general run of goods are held pretty steadily, and jobbers are disposing of their stocks in a reasonably satisfactory way and without too radical a disturbance of the market. Manufacturers, as a rule, are indisposed to make reductions immediately, simply on account of the decline which has taken place in Iron, and are showing a wise regard for the market, as a whole, in maintaining prices as firmly as they can. The fact that in most articles of Hardware the raw material is a comparatively small element of the cost makes it necessary to hold prices about where they are, especially as many manufacturers did not advance their goods on the basis of the highest prices lately ruling for Iron and Steel. The tendency in labor has been toward higher costs, and a good many advances, sometimes slight, have been made, often counterbalancing the lower prices of the raw material. Manufacturers generally report business as quiet, in view of the fact that the trade are pretty well stocked up with goods, which are gradually being worked off. There is a disposition on the part of manufacturers to wait until stocks throughout the country are out of the way before seeking too aggressively to obtain new orders. In accordance with this policy manufacturers in several prominent lines have recently decided simply to reaffirm existing prices, arguing that any concession which could be made would fail to attract much business, and would have a bad effect on the market at large. The retail trade, while they have suffered something in the sudden break in prices of a few important lines, realize that the decline in the general line of Hardware has as yet been comparatively unimportant, and are keeping up their stocks to a fair working level. Their proper policy is evidently to purchase cautiously and in moderate quantities, and to give their special attention to the enterprise and skill with which their business is conducted, so that their goods may move at a fair profit. Export business continues large and promising. General conditions are excellent.

Chicago.

(By Telegraph.)

It is the aggregates that surprise the Hardware trade. Cursory judgments respecting the volume and conditions are apt to be deceiving, for the orders are mainly for small amounts. They are so much smaller than dealers have been accustomed to give at one time heretofore that the explanation for the impression that trade is only moderate is thus presented. One of the largest Chicago Hardware jobbers says that trade has been larger than the previous week, and that it is eminently satisfactory. From that statement reports range down to "fair," with

the majority up toward a brisk state. In some lines dealers are now ordering for goods to be delivered in the fall, though the extent to which this is being done is less than a year ago, when conditions pointed so strongly to the insufficiency of many stocks. Every branch of the trade is experiencing a good healthy demand from the country districts, trade in the cities still being involved in the siege upon business imposed by the strikes. For Tin Goods orders for shipment in the fall all are accumulating with perhaps a more ready facility than in some other lines. The generality of Hardware shows unchanged prices, but some few decreases are noted. Heavy Hardware is among the greater beneficiaries of the current trade, orders from manufacturers being both numerous and for larger than the ordinary tonnage. This, however, is partly at the expense of the mill and factory trade.

St. Louis.

(By Telegraph.)

For the month trade continues good, and business so far this week is better than any recent one. Seasonable goods are the largest item in orders, while Sporting Goods, Lawn Tennis, Golf and Baseball are in good demand. Lawn Hose, Sprinklers, Hose and Reels are also selling well. Wants in staple fall lines are naturally not being covered with the freedom which ruled last year. The fact is not taken as a lack of confidence, but as an evidence of the conservatism, always found when prices have reached what is considered the top notch. Current orders are a sufficient evidence that the trade is not afraid to buy for nearby requirements. Salesmen are making but little complaint, it is said, as to irregularities in the price of Shelf Hardware, and, broadly stated, jobbers are showing no unusual anxiety to dispose of stock. Salesmen are preparing to return to headquarters, and those now in from Southern points say prospects for fall business are exceedingly promising. The Heavy Hardware interests say sales are up to the average, and out of town trade in good volume. Sales of Wagon Repairs, Tires and Horseshoes have very decidedly increased since the street railway strike was inaugurated in St. Louis. Every manner of vehicle has been pressed into the transportation of passengers. There is no immediate prospect of settlement, and meanwhile the retail trades are the greatest sufferers. More cars, however, are being operated.

Notes on Prices.

Wire Nails.—The demand for Wire Nails, while not showing any increase, is of fair volume. Orders are being placed cautiously, largely for less than carload lots. This class of orders is so prevalent that delays in shipment from factory are not infrequent. Prices remain firm at the following quotations, f.o.b. Pittsburgh, terms 30 days or 1 per cent. off in 10 days:

To jobbers in carload lots.....	\$2.20
To jobbers in less than carload lots.....	2.22½
To retailers in carload lots.....	2.35
To retailers in less than carload lots.....	2.45

New York.—There is not a particularly heavy demand for Wire Nails in the local market. Quotations are unchanged, as follows:

To retailers, carloads on dock.....	\$2.53
To retailers, less than carloads on dock.....	2.66
Small lots from store.....	2.75

Chicago, by Telegraph.—Trade in Wire Nails can scarcely be referred to in other terms than active, yet it is, perhaps, not quite so brisk as a short time ago.

The first spring demand has been filled and building operations at some centers are jeopardized by new complications with labor. If these pass away quickly a brisk trade is anticipated throughout the summer. Prices are unchanged, quotations from store being \$2.53 for single carloads and \$2.60 for small lots.

St. Louis, by Telegraph.—Some carload business in Wire Nails has been transacted and the week opens up well in this respect. Compared with other commodities, Nails are considered low at present prices. Prices are \$2.58, base, St. Louis, for single carloads; smaller lots, \$2.68, base.

Pittsburgh.—There is no special feature in the Wire Nail trade to note, the demand being only fair, and it will probably decrease, as trade in Wire Nails usually falls off in the summer months. The tone of the market is strong, and we quote:

To jobbers in carload lots.....	\$2.20
To jobbers in less than carload lots.....	2.22½
To retailers in carload lots.....	2.35
To retailers in less than carload lots.....	2.45

The above prices are for immediate acceptance and prompt shipment only, and are f.o.b. Pittsburgh, terms 30 days, 1 per cent. off in 10 days.

Cut Nails.—At a meeting of the Cut Nail manufacturers, held May 25, former prices were reaffirmed. Action was also taken looking to the compilation of a list of jobbers to whom a rebate of 10 cents per keg will be given, provided orders reach a certain number of kegs per month. Quotations are firm, as follows, f.o.b. Pittsburgh, terms 30 days, 1 per cent. off in 10 days:

Carload lots.....	\$2.05
To jobbers in less than carload lots.....	2.10
To retailers in less than carload lots.....	2.20

New York.—Demand at this point is moderate and the market firm. Prices are as follows:

To jobbers in carload lots on dock.....	\$2.23
To jobbers in less than carload lots on dock.....	2.28
To retailers in less than carload lots on dock.....	2.41
Small lots from store.....	2.50

Chicago, by Telegraph.—Mills are negotiating a fair number of orders for Cut Nails, and the store trade shows little change from the steady and fairly good demand of some time past. For small lots \$2.40 is the unchanged price.

St. Louis, by Telegraph.—Improvement has been noted in the sales of Cut Nails this week, but no especial motive can be assigned by jobbers for the increased buying. Jobbers' price remains at \$2.50, base.

Pittsburgh.—Demand for Cut Nails is very light and for small lots only. We quote as follows: Carload lots, \$2.05; less than carload lots to jobbers, \$2.10, all f.o.b. cars Pittsburgh, net cash 30 days, or 1 per cent. off for cash if paid within 10 days from date of invoice.

Barb Wire.—No important change has taken place in the Barb Wire market, and orders continue to call for limited quantities. Quotations for domestic trade are as follows, f.o.b. Pittsburgh, net cash 30 days, or 1 per cent. discount for cash in 10 days:

To jobbers in carload lots, Painted.....	\$2.65
To jobbers in carload lots, Galvanized.....	2.80
To jobbers in less than carload lots, Painted.....	2.67½
To jobbers in less than carload lots, Galvanized.....	2.82½
To retailers in carload lots, Painted.....	2.80
To retailers in carload lots, Galvanized.....	2.95
To retailers in less than carload lots, Painted.....	2.90
To retailers in less than carload lots, Galvanized.....	3.05

Ellwood and Baker Wire is 5 cents and Washburn & Moen Glidden 10 cents per 100 higher than the foregoing prices.

Chicago, by Telegraph.—A continuance of the brisk inquiry for Barb Wire, noted a week ago, prevails, though the latest indications point to a slight decrease in the unusual activity. However, the market is still active, with the orders emanating from all sections of the West. Quotations, Chicago delivery, are: Single cars of Plain Annealed Wire, \$2.48; Plain Barb Wire, \$2.98; Galvanized Barb Wire, \$3.13, with 10 cents additional for small lots from jobbers.

St. Louis, by Telegraph.—Demand for Barb Wire is increasing, and mills said to be in receipt of urgent calls for shipment. Price for Painted in carload lots is \$3.03; smaller lots, \$3.13, St. Louis, per 100 pounds. The advance on Galvanized is 15 cents per 100 pounds.

Pittsburgh.—Barb Wire demand is very light and this season has been one of the most unsatisfactory in the Barb Wire trade as far as demand is concerned for many years. We quote for domestic trade as follows: Painted Barb Wire, \$2.65, in carload lots to jobbers, with an advance of 15 cents for Galvanized, all f.o.b. Pittsburgh, terms 30 days or 1 per cent. off for cash in 10 days.

Plain Wire.—Former conditions rule in the Plain Wire market. The demand is fair, with prices well maintained. Quotations are as follows, f.o.b. Pittsburgh, terms 30 days or 1 per cent. discount for cash in ten days:

	Base sizes.	Plain.	Galv.
To jobbers in carload lots.....	\$2.15	\$2.55	
To jobbers in less than carload lots....	2.17½	2.57½	
To retailers in carload lots.....	2.30	2.70	
To retailers in less than carload lots...	2.40	2.80	

The above prices are for the base numbers, 6 to 9. The other numbers of Plain Wire and Galvanized Wire take the advances indicated in the following table:

Plain Fence Wire Advances (Catch Weights).

Nos.	Base	Galvanized.
6 to 9.....	\$0.05 advance over base.....	\$0.40 extra.
10.....	.10	.40
11.....	.15	.40
12 and 12½.....	.25	.40
13.....	.35	.40
14.....	.45	.75
15.....	.55	.75
16.....	.70	1.00
17.....	.85	1.00
18.....		

For even weight bundles, 50 pounds and over, 5 cents per bundle advance on above.

Pittsburgh.—Conditions in the Plain Wire market are unchanged. There is a fair demand, which will probably decrease, as spring trade is largely over. We quote as follows:

	Plain.
To jobbers in carload lots.....	\$2.15
To jobbers in less than carload lots.....	2.17½
To retailers in carload lots.....	2.30
To retailers in less than carload lots.....	2.40

Galvanized Wire up to No. 14 is 40 cents advance on Plain, Nos. 15 and 16, 75 cents advance, and Nos. 17 and 18, \$1 advance.

Dripping Pans.—We give below the list recently adopted by the manufacturers of Dripping Pans, from which the goods are hereafter to be sold, instead of by the pound, as heretofore. The list is as follows, and is subject to a discount of from 60 to 60 and 5 per cent. to the general trade:

Small Sizes.

	Per dozen.
6½ x 7¾, 4 dozen in crate.....	\$1.70
6½ x 9, 4 dozen in crate.....	2.00
6½ x 13, 4 dozen in crate.....	2.45
7 x 8, 4 dozen in crate.....	1.80
7 x 10, 4 dozen in crate.....	2.10
7 x 14, 4 dozen in crate.....	2.65
8 x 10, 4 dozen in crate.....	2.20
8 x 12, 4 dozen in crate.....	2.55

Large Sizes.

	Per dozen.
8½ x 15, 3 dozen in crate.....	\$3.10
8 x 17, 3 dozen in crate.....	3.45
9 x 12, 3 dozen in crate.....	2.60
9 x 14, 3 dozen in crate.....	3.00
10 x 12, 3 dozen in crate.....	3.05
10 x 14, 3 dozen in crate.....	3.40
10 x 15, 3 dozen in crate.....	3.50
10 x 17, 3 dozen in crate.....	4.00
11 x 16, 3 dozen in crate.....	4.15
12 x 12, 3 dozen in crate.....	3.50
12 x 17, 3 dozen in crate.....	4.45
12 x 19, 3 dozen in crate.....	4.85
13 x 13, 3 dozen in crate.....	4.00
14 x 14, 3 dozen in crate.....	4.50
14 x 15, 3 dozen in crate.....	4.75
16 x 17, 3 dozen in crate.....	5.50
18 x 19, 3 dozen in crate.....	6.50

All 2½ inches deep.

Wrought Iron Pipe.—There has been no important change in the Wrought Iron Pipe market since last week. The material reduction in prices then announced has gone into effect, the market to the large trade being held firmly on the basis of discounts then published, with slight concessions to jobbers. Stocks in the hands of merchants are in some cases quite heavy, and as the goods were purchased at considerably higher prices than are now current, efforts are being made to maintain quotations on small lots at something like the prices recently ruling.

Tire and Stove Bolts.—A meeting of the manufacturers of Tire and Stove Bolts was held last week, and after a careful canvass of the situation, it was decided to maintain prices without change.

Screws.—Similar action was taken by the Screw manufacturers, by whom existing prices were reaffirmed, the decline in raw material not being regarded as requiring a reduction in price.

Builders' Hardware.—The manufacturers of Locks and miscellaneous related goods are working together with a much better degree of harmony than has usually been the case. While this is a difficult line to control so far as the matter of price is concerned, there is a disposition to agree in the general range of prices and avoid as far as possible such competition as has heretofore frequently characterized the market. At a conference last week regarding the situation it was decided to adhere to existing prices without change.

Building Papers.—There has been some weakness in the market for Roofing and Building Papers, which is reflected in the following prices: One-ply Tarred Roofing is quoted \$32 to \$37 per ton, the shades of price being determined partly by quality, but also by the territory in accordance with the difference in freight. Two-ply Roofing is now 75 cents per roll and Three-ply \$1 per roll. There is no material change in Deafening Felts and Sheathing Papers, the former being now quoted \$43 to \$45 per ton.

Glass.—As far as can be learned no decision has been reached in regard to extending the present fire two weeks longer than was anticipated, and curtailing the amount of foreign Glass that was contracted for by the American Window Glass Company. Locally trade is quiet among jobbers and small sizes of Glass scarce. Prices, it is reported, are well sustained, even in the absence of business. Quotations are as follows, Eastern jobbers, less than carloads: Single strength—First bracket, 85 per cent.; second and third brackets, 85 and 10; all above, 85 and 25. Double strength—First bracket, 85; second, third, fourth and fifth brackets, 85 and 10; all above, 85 and 20. Factory prices for carloads are as follows:

Single strength:	
First bracket.....	85 and 25 %
Second and third brackets.....	89 %
All above.....	90 and 5 %
Double strength:	
First five brackets.....	89 %
60-inch bracket.....	90 %
70 to 100 inch brackets, inclusive.....	90 and 10 and 5 %
All above.....	90 and 20 %

Paris Green.—There is little interest taken in the Paris Green market by the trade and dullness is the prominent feature. There seems to be no inducement for merchants to anticipate their wants while competition continues keen. There is some irregularity in prices, quotations ranging from 12½ to 14 cents in kegs, according to customer and quantity.

Oils.—*Linseed Oil.*—The past week is conceded to have been unusually dull, as far as Linseed Oil business is concerned. Consumption by painters in this territory is reported as being exceedingly light, and high prices are against the accumulation of stocks. The market is firm at the following quotations: City Raw, 65 cents in

lots of 5 barrels or more and 66 cents per gallon in lots of less than 5 barrels. Western and State Oil is held at 63 cents for any quantity. As usual, Boiled Oil is 2 cents per gallon advance.

Paints and Colors.—*Leads.*—Conditions in the White Lead in Oil market remain unchanged. Prices are firm and consumption comparatively light. Quotations are as follows: In lots of 500 pounds and over, 6½ cents per pound; in lots of less than 500 pounds, 7 cents per pound.

Spirits Turpentine.—The Turpentine market is firm but dull at this point, sales being confined to small lots. Stocks are not excessive, but are ample to supply demands, as large buyers are holding off. Advices from the South report receipts sufficient to fill May contracts and an easier tone in the market. Local quotations are 51 cents for Southern and 51½ for machine made barrels, with some holders asking ½ cent more.

Letters from the Trade.

Our readers are invited to discuss in these columns questions of trade interest connected with the manufacture or sale of Hardware. We shall be pleased to have a free expression of opinion on subjects deserving the attention of Hardware merchants and manufacturers.

Quotations to Consumers.

The following communication explains itself and comes from a correspondent as illustrating the competition which the retail trade are sometimes called upon to meet:

A prominent jobbing house not 1000 miles from Chicago has issued a book of quotations on a large line of goods suitable for the use of railroads, and of course suitable for the use of other people as well. The range of prices quoted is, it will be seen, about as low as retailers are able to buy at. Quotations of this kind are not infrequently found in the hands of individual consumers, to the injury of the defenseless retailer, for such he becomes when confronted by his customers with these quotations. The following will give an idea of the kind of quotations which are sent out broadcast to fall into any one's hands:

	Discount.
Common Carriage Bolts.....	.60 and 5 %
Machine Bolts.....	.60 and 10 and 5 %
Loose Pin Cast Butts.....	.70 and 10 %
Iron Jack Chain.....	.60 and 10 %
Twist Drills under 1¼-inch.....	.65 and 5 %
Stebbins' Pattern Molasses Gates.....	.80 and 10 and 5 %
Light Strap Hinges.....	.66 2-3 and 25 and 10 and 5 %
Heavy Strap Hinges.....	.70 and 25 and 10 and 5 %
Light T Hinges.....	.50 and 10 and 25 and 10 and 5 %
Heavy T Hinges.....	.60 and 10 and 25 and 10 and 5 %
Extra Heavy T Hinges.....	.66 2-3 and 25 and 10 and 5 %
Soldering Coppers.....	.24 cents per pound
Mineral Door Knobs.....	.65 cents per dozen
Porcelain Door Knobs.....	.75 cents per dozen
Square Hot Pressed Nuts.....	4½ cents per pound
Hooks, Staples, &c.....	.85 and 10 %
Flat Head Iron Wood Screws.....	.80 and 10 and 5 and 5 %
Brass Screws.....	.77½ and 10 and 5 %
American Cut Tacks.....	.90 and 20 %
Swedes Upholsterers' Tacks.....	.90 and 40 and 5 %
Gimp Tacks.....	.90 and 40 and 5 %

I should like to know whether other jobbers are pursuing a similar course, and what we retailers are to do about it.

A Daily Cry.

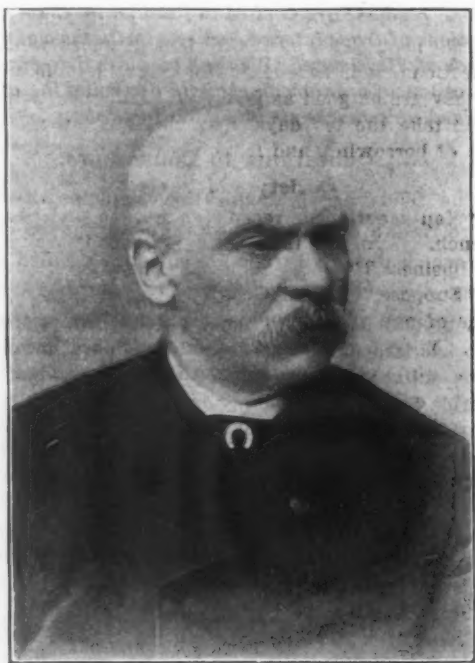
Under the above heading a merchant in Indiana thus refers to the reduction in the price of Nails:

The daily cry from the farmer is that his products are constantly going down and everything else going up. They do not think of our loss with 300 or 400 kegs of Nails on hand, and a slump of \$1 a keg. This has killed the trade with the farmer at present and he is waiting for lower prices.

Henry Barnett.

HENRY BARNETT, president of the G. & H. Barnett Company, Philadelphia, Pa., manufacturers of the well-known Black Diamond Files, died at his home in that city on the 22d inst., after an illness extending over a long period. His death was due to a complication of diseases.

Mr. Barnett, whose portrait is presented herewith, was born March 13, 1838, at Nottingham, England. At the age of ten he with his parents and brothers came to America and settled in Philadelphia. When 11 years of age he became an apprentice with the late J. Barton Smith, Philadelphia, and learned his trade as a file maker. His ability as a workman soon asserted itself, and in 1863 he removed to Pittsburgh, where he with his brothers, William and George, embarked in the File and Saw manufacturing business under the firm name of Barnett Bros. The business had not been long established when it was found that the city of Philadelphia



HENRY BARNETT,

presented greater possibilities for a successful trade, and they returned to Philadelphia, where George and Henry rented small quarters on Haydock street and commenced the manufacture of Files exclusively, under the firm name of G. & H. Barnett. Their business increasing, they later removed to a small two-story building on Richmond street, which building formed the nucleus of the now widely known Black Diamond File Works, which cover about 5½ acres. Upward of 500 hands are employed in the works, and the products are distributed throughout the world.

When the business was established the firm's products were turned out solely by hand. When machinery began to take the place of hand labor the firm were ready to move with the times, and proceeded to make installations of machinery, which eventually led to the abandonment of the hand made File. In 1895 the firm became incorporated under the laws of Pennsylvania and are now known as the G. & H. Barnett Company. The incorporation marked the forty-eighth year of meritorious work shared by the brothers side by side.

Mr. Barnett was a man greatly esteemed by all business men with whom he came in contact. He was most fair in all his dealings and earned distinction as an upright and honorable man of business, whose word was always as good as his bond. In him the employees of the company lose a friend. As president he was always

accessible to them for the purpose of adjusting a grievance or aiding those needing it with friendly and practical advice. For years he had enjoyed the reputation of being one of the best practical File makers in the country, and was looked upon as an authority in the File manufacturing business.

Mr. Barnett served as a volunteer in the Civil War, and was a member of Winfield Scott Post, No. 114, G. A. R. He was also a prominent Free Mason, being a member of the Philadelphia Consistory, St. John's Commandery, K. T., No. 4; Kensington Chapter, No. 233; Columbia Mark Lodge, No. 91; Williamson Lodge, No. 369, F. and A. M., and the Mystic Shrine. He was also a member of the orders of the Knights of Birmingham, A. O. U. W., Red Men, Odd Fellows and a member of the Society of the Sons of St. George, Union League Club, the Belmont Driving Club, the Turf Club, the Hardware Merchants and Manufacturers' Association and the Black Diamond Beneficial Association. In all of these organizations he took an active interest.

The deceased leaves a widow, one daughter and four sons, the eldest of whom, Alfred W. Barnett, is secretary-treasurer of the G. & H. Barnett Company.

Hardware Club of New York.

THE following new members were added to the rolls of the Hardware Club at the last meeting of the Board of Governors:

CHARLES A. HAUCK,	
Hardware Board of Trade, New York.	
JOHN H. ROBINSON,	
	253 Broadway, New York.
E. H. SCHLEY,	
	256 Broadway, New York.
FREDERIC N. STANLEY,	
Stanley Rule & Level Co., New Britain, Conn.	
JOSEPH VAN CLEFT,	
	Newburgh, N. Y.
FRANK L. WILCOX,	
Berlin Iron Bridge Company, East Berlin, Conn.	

The Globe-Wernicke Company.

THE GLOBE-WERNICKE COMPANY, manufacturers of Filing Appliances, Office Furniture, Elastic Bookcases for home and office, &c., with main office and works at Cincinnati, Ohio, have recently completed a large plant at Norwood, a suburb of Cincinnati, for the exclusive manufacture of the Wernicke Elastic Bookcases. The site of the factory covers 14 acres, fronting 920 feet on Carthage avenue and 600 feet on Ross avenue. The main building is of red pressed brick, with two wings 75 x 250 feet, and one wing 75 x 150 feet, all being three stories and basement. Auxiliary buildings consist of dry kilns and storage for lumber, 64 x 180 feet; power house, 66 x 75 feet; and veneer mill, 75 x 85 feet. The total floor area is about 200,000 square feet. The present power plant has a capacity of 300 horsepower, to which 600 additional horse-power may be added. The equipment consists of a 300 horse-power medium speed, heavy duty engine directly connected with a 200 k.w. generator, and two 300 horse-power water tube boilers. The entire plant will be equipped with the Warren Webster vacuum heating system. Three large electric freight elevators have been installed and also a system of automatic sprinklers for fire protection. One of the features of the plant is a large cistern of 500,000 gallons capacity built on the French plan of solid concrete. This will supply the plant with soft water and afford a reserve for fire protection. The other sources of water supply are deep well and steam pump and the city water works. The lighting of the plant, as well as the transmission of power throughout, is electric. A large shower bath, with hot and cold water, in the basement, is one of a number of conveniences designed for the welfare of the employees. The plant will afford employment to about 300 hands and will have a capacity of three carloads of Bookcases per day.

The company will continue to operate their Cincinnati factory, which has about the same floor area as the Norwood plant, as heretofore, in the production of Filing Cabinets, Desks, Stationers' Goods, &c.

E. Prentiss Grindstone, Hardware Broker.

CHAPTER III.

A Successful Launch.

THE eventful second day of May was drawing to a close. Seated before a small roll-top desk Grindstone looked contentedly at a number of entries which the light from a Bracket Lamp attached to the desk side revealed in a long narrow book lying open before him. Tilting back in his chair until the proper poise permitted an easy rocking motion he gave himself up to the vistas of unchecked, expanding conquest, stretching away in every direction.

'Air Castles.

Visionary messenger boys arrived in quick succession, adding their telegrams to the stack of mail orders on his desk, while a phantom typewriter was busy clicking away at his dictation. Applications for positions from unfortunate Hardware clerks were not deposited in the waste basket. A continued stamping on the landing outside shattered this mental picture, and the long surveyor entered, spraying everything in reach as he brushed the melting snow from his overcoat.

A Weather Jonah.

"I am queen of the May, mother!" he sang sarcastically, drawing a chair to the Cannon Stove, in which was blazing a good fire of soft coal. "Grindstone, are you the weather-Jonah?" he continued.

"I wish I was," laughed Grindstone, "as it suits me to a T."

"How's that?" questioned the surveyor. "You can't sell Hose this kind of weather."

"Indeed I can," replied Grindstone. "If we had genuine spring weather my name would be Dennis, for then the people would have gone to the Hardware stores in April to buy their Hose. As it is they have given their Hose requirements no thought, and the store people have done no soliciting. You may believe I watched that pretty closely the last month. Just listen to this," reading from the book on the desk:

The First Sales.

"Judge Patterson, 100 feet Woven Cotton Hose, coupled, \$14.20; Dr. Layton, 50 feet, \$7.10; and, let's see, here are six others, 50 feet each, besides old Joe Buck."

"You didn't get old Joe, did you?" interrupted the surveyor.

"Yes, I did," replied Grindstone. "Here he is down for 50 feet. You see, he joined our club. Old Joe, you know, won't buy anything unless he thinks he's in on the ground floor, so when I saw him I used the same argument that was successful with the others."

A Hose Club Organized.

"Now, Mr. Buck," I said, "if you haven't made any arrangement for the hose you will want when the water works is done, it may be possible for you to join a club we are getting up to get good Hose at the 1000-foot price. Of course he asked lots of questions, but the proposition on its face seemed so plausible that he ordered with less hesitation than I really expected. Besides, he was taken with that five-year-old relic. You know Burns cut off about a foot and gave it to me for a sample. His expiring kick was against the odd 10 cents for the Couplings, but the list of names I showed him settled that. Therefore I say with the Little Tycoon, 'never mind the weather,' as I will net about \$14 out of my day's work."

A Pleasant Sensation.

"Do you know, French," he continued, as he put away the book and closed the desk, "there is an exhilarating feeling after a day like this that I enjoy more than going to parties and receptions. And it's not the money

altogether, either. It's more like—" he hesitated, at a loss for words to express a sensation but ill defined.

Noticing this the surveyor said sympathetically, "Yes, I know; it makes you feel as though you were of some account—as though you had done something."

"That's it exactly, French," exclaimed Grindstone. "You express my meaning with mathematical exactness."

Doing Business Without Capital.

"But see here," inquired French, moving back from the stove, "where have you stored the Hose? I don't see any around."

"Why, that's the beauty of the whole thing," Grindstone replied, walking back and forth between the Stove and the alcove. "I have a quotation on 1000 feet and taken orders for 500. The doctor, judge, old Joe and the rest understand there must be enough club members (this with a smile) to get 1000 feet, so they are nearly as much interested as I am to secure subscribers for the remaining 500. I put up no money at all in the deal. The Hose people wanted reference, so the cashier at the National said I could refer to his bank and he would fix that part. This means 60 days in which to make my collections, and there is no risk with the club members, as they are as good as gold. If I had the ready cash I could take the ten days' discount, but I don't like the idea of borrowing, and it isn't really necessary."

Society and Business.

"You mentioned receptions a moment ago," said French. "Do you think being in society helps one in his business?"

"Suppose," replied Grindstone, "we look around at some of our townspeople and see. There is Mr. Burnside. Years ago he made the first of his lathes in his blacksmith shop, working at them at night, and, while now he entertains quite often, it is evident he is bored, but makes the sacrifice for his daughters' sake, and, as the entire product of the works is shipped away, entertaining townspeople doesn't help his business. Then there is Steele of the old Hardware firm. He never has had but one or two strangers at his house for a meal, and they were horse buyers; yet he is successful and respected."

Advertising in Society.

"How about Thompson?" inquired French.

"There might be an exception in his case," answered Grindstone, "his business dealings being largely with the ladies. They buy Wall Paper, Art Goods and such things to decorate the house, and I dare say it pays him to cultivate the entertainers, especially in a town of this size. In fact, I know he considers it a good advertisement to be seen at the different houses, and when he meets strangers, especially new residents, he has himself introduced as Mr. Thompson, the artist, so that, in the explanation which ensues, the stranger knows who he is, where his store is and all about the goods he has to sell."

The Benefit of Hospitality.

"How is it in the case of the Hardware broker?" asked French, as Grindstone put on his coat.

"Myself? Oh, I haven't been one long enough to find out. I think I may be able to answer that question to-morrow, as father will have Mr. Burnside and some more of these substantials at the house this evening, and I think in the hour of relaxation Grindstone, Jr., may be able to benefit by the kindly sentiment established through the hospitality of Grindstone, Sr. So good-night."

(To be continued.)

Smith & Dexter have opened a new store, at Coudersport, Pa., handling a complete line of Shelf Hardware and Agricultural Implements. Coudersport is referred to as a rapidly growing town, and the new firm will endeavor to carry everything wanted in a lumbering and farming section.

Is There Any Satisfactory Way of Keeping Show Windows from Sweating?

UNDER this title there recently appeared in our columns an inquiry from a prominent Hardware concern in Tennessee for a method to prevent show windows from sweating. Following is a description of some methods employed by the trade to surmount the difficulty.

Method of a Philadelphia House.

W. P. Walter's Sons, 1233 Market street, Philadelphia, have experienced considerable trouble from sweating show windows, particularly in one devoted to a large display of fine Mechanical Tools. It was necessary not only to prevent the glass becoming frosted, which would hide the goods from the view of people on the sidewalk, but to prevent dampness and consequent rusting of the bright Steel goods, caused by the melting of the frost, or sweating. We have the following advice from the firm as to the plan adopted by them to overcome the difficulty:

THE CONDITIONS.—To understand the conditions fully, it may be explained that there is a large plate glass surface and that the windows were made practically air tight inside by sash at the back extending from the floor of the windows to the ceiling. We found, however, that people looked through the plate glass and glass sash into the store without seeing the goods displayed in the windows.

To remedy this defect 3 feet of the lower portion of the sash was replaced by wood work, with a door hung on hinges, at each window. Our building is situated on the north side of the street, with low buildings opposite, so that we get the full force of the sun a large portion of each day.

THE POINT AIMED AT was to keep the temperature in the windows the same as that outside. This is accomplished by putting down the awnings as soon as the sun begins to shine upon the windows, even in midwinter, and to put them up again when the sun gets off, to allow the glass to cool off before evening.

ANOTHER RULE which we rigidly enforced is that the doors in the windows are not to be opened except at noon, when the temperature outside is the warmest. We keep the doors locked at all other times. Should there be an article in either of the windows which a customer wanted, he would have to call for it at noon or we miss the sale. Under no considerations will we allow the doors to be opened at any other time.

RESULT OF MANY EXPERIMENTS.—The foregoing plan, which prevents the windows frosting and sweating, was perfected after much experimenting and many failures.

HUMADINE.—To absorb the natural dampness in the atmosphere, which tends to rust polished steel goods, we have found Humadine excellent. This is used in refrigerators to keep the air dry and comes in paste form, put up in tin cans. It can be procured from druggists. We put a can of it in each window in a corner, with goods so arranged that it cannot be seen.

Another Effective Method.

The Korb Hardware Company, Louisville, Ky., obtain the same results—an equality of temperature inside the show window with that out of doors—by a somewhat different method from that pursued by the Philadelphia concern. They explain their plan as follows:

CIRCULATION RECOMMENDED.—The best method we know of to prevent windows sweating is to provide a complete circulation in the show window, and to keep it tightly closed from the inside of the store during the cold weather. Holes or air grates must be so placed as to allow the cold air from outside to enter the lower part of the show window, and to escape at the top.

The best place for the openings is at the bottom and top of the glass. The openings should be covered with movable slats, with cords fastened to them in such a way as to allow the slats to be opened and closed from the inside, without opening the doors of the show window.

ADVANTAGE OF SHUTTERS.—If shutters are not used a great deal of dirt will enter the windows on dusty days, and rain will drive in on rainy days.

EQUALITY OF TEMPERATURE.—By the use of this system the temperature will be the same inside the show window as the weather outside; consequently, the show window must be kept closed so as not to admit the warm air from the store.

SPRINKLING OIL INSTEAD OF WATER.—We also advise the use of floor oil instead of sprinkling water on the store floor for sweeping. Considerable moisture is caused by sprinkling the floors, which will settle on the glass doors or windows, and will also affect the appearance of polished goods displayed in the store.

How a St. Louis Merchant Does It.

Chas. W. Kayser, 914 South Fourth street, St. Louis, Mo., also recognizes the necessity of keeping show windows closed to prevent the glass sweating. He writes as follows in regard to his methods for accomplishing this:

AIR TIGHT WINDOWS.—My show windows are air tight, with no gas or electric light in them. I have the light outside the windows. I never open the windows in cold weather, or in the winter months, until the weather changes.

MY EXPERIENCE has been, that, if I open the show windows and immediately close them during the winter, should the weather turn cold several days after, the windows become covered with frost. The cellar of my store is wet, which is one of the conditions mentioned by the Tennessee house who have appealed for information.

D. L. Esterly Sons,

Pottsville, Pa., describe a method which they have successfully adopted for preventing windows sweating, as follows:

A VERY BAD CASE.—We cured the worst case of sweating windows ever seen in this section. The rear of our window we had closed tightly. Then from the front or outside, and below the glass, we put in two or three 4-inch light cast iron bends, one end of each opening into the floor of the window and the other end outside.

The openings were covered on the inside with Wire Window Screen and on the outside with Galvanized Wire Cloth. The openings cause the temperature on the inside of the glass to be the same as on the outside, and sweating is impossible.

A Very Simple Remedy.

E. P. Langesen of Clintonville, Wis., has found a preventative for frosty windows in the use of ammonia in washing them. He refers to the matter as follows:

AMMONIA TREATMENT.—I suggest that those troubled with sweaty windows have them washed every week and use ammonia in the water. This will tend to cleanse the glass more thoroughly and also will prevent sweating. My windows never sweat, while I notice that my competitors' windows sweat and are covered with frost during the winter months. I take no further precautions than washing the glass with ammonia water every week.

A NEVER-FAILING METHOD.—I have followed this plan in two or three other towns in which I have been in business with the same satisfactory results. I do not have any faith in the efficacy of the vents the Tennessee concern speak of.

The Various Methods Described

cover a wide range of experience and will be of value to those of our readers who have experienced trouble with sweaty and frosty windows. It may be found practical to combine the features which appeal to individual merchants as best adapted to their peculiar cases. Satisfactory results have been obtained from inclosed windows, both with and without air vents.

The main point seems to be to keep the temperature in the window the same as that out of doors. The use of ammonia in the water used for frequent washing is the simplest plan presented. We shall be glad to receive further suggestions on this subject from those who use other effective methods of preventing windows sweating.

Thos. Dunn & Co., Vancouver, B. C., have lately erected a new building, 50 x 100 feet, four stories and basement. The first floor and basement are used for ship chandlery, the remaining floors being devoted to their wholesale Hardware department. Elsewhere in the city the corporation have a large retail store. They make a specialty of Mining Supplies and are also large importers of Plate Glass. Besides the above lines they carry Stoves, Tinware, Sporting Goods, &c. A branch store is located at Atlin, B. C.

R. H. Diebert, Oskaloosa, Kan., has sold out his stock of general Hardware, Farm Implements, Stoves, &c., to F. J. Searle, who will continue at the old stand.

An Old Hardware Invoice.

THE invoice here reproduced is an antiquity of the early part of this century, which reflects some of the prices on staple goods then current. It was sent us by L. Pease & Son Company, Hartford, Vt., who found it in a building erected in 1790, now occupied by them as a store. The curious merchant who may have grumbled at the present price of Screws, now more than 100 per cent. higher in cost than a year or so ago, may find some comfort in the knowledge that even at 80 per cent. discount on the present list they were over 200 per cent. higher then for what was doubtless a much inferior prod-

July 1 next. The new concern will begin buying stock on June 1.

Preventing Rust.

THE rusting of bright Steel samples by the dampness in the atmosphere is a serious trouble in some portions of the country. A firm advise us that they are in the habit of coating all kinds of bright Steel goods throughout the store with a composition of white wax and benzine, and that they always keep a can of the preparation on hand. The white wax is dissolved in benzine and the apparently clear liquid is put on the

No. 4, Union-Street.

Boston, Nov. 4th 1813

Messrs Wells & Grace

Bo't of ~~Benjamin Andrews~~
Henry Smith & Co

1. Box No. 5. Wood Card. conty. 1 Doz prs. v b. =
1 lb. 10.00 Mould Mine — 29/100, 2.44
2. Lno. 1 in No. 13. Wood Screws @ 6/. — 2. =
6. " 7/8 " " " " " 4/6. 4.50
4. " 7/8 " " " " " 3/6 2.33
2. " 7/8 " " " " " 3/. 1.00

\$19.27

Lawler?

Henry Smith & Co

An Old Hardware Invoice.

uct. The table herewith shows the prices in net figures for the two periods:

	1-in.	3/4-in.	1/2-in.	3/8-in.
	13	11	11	7
Iron Wood Screws, 1813..	\$1.00	\$0.75	\$0.58	\$0.50 per gross.
" " " 1899..	0.27	0.21	0.18	0.15 " "

Requests for Catalogues, &c.

LYONS HARDWARE COMPANY, Lyons, Ohio, lost their entire stock by fire on the 20th inst. The firm have rented quarters directly opposite their former site and will stock them up at once. E. E. Milliken, manager, requests copies of catalogues and price-lists from manufacturers and jobbers of Shelf and Heavy Hardware, Bicycles, Stoves, Silver Ware, Clocks and Jewelry.

Meyer-Neville Hardware Company, Meridian, Miss., have been incorporated, and will conduct a wholesale and retail business in Shelf and Heavy Hardware, Stoves and Tinware, Agricultural Implements, Sporting Goods, &c. They are erecting a four-story building with stone front, 62 x 75 feet in dimensions, for their exclusive occupancy, and expect to formally commence business on

goods with a camel's hair brush. When the composition hardens the tool is wiped off with chamois skin, enough of the wax remaining to prevent rust and yet not sufficient to be noticeable.

Background for Tools.

A CONCERN who carry a large line of machinists' fine tools, and put samples on boards for window display, have adopted black velvet as a covering for the boards. They advise us that they have found this the best material, as the contrast between the background and the bright tools shows the goods off to the best advantage. There is, they state, nothing in the velvet which injures the tools, as they have found to be the case with other material.

Kenyon Hardware Company, Dallas, Texas, have been incorporated with a capital stock of \$50,000, paid in. The interested parties are W. R. Kenyon, S. C. Randlett and H. C. Barlow. The business is both wholesale and retail, and the line of goods carried embraces Shelf and Heavy Hardware, Stoves and Tinware. The company expect to move into larger quarters in the fall, and will also probably add to their capital at that time.

Seventeen Years in the Hardware Business.

FROM A CANADIAN CORRESPONDENT.

THE time seems short since that pleasant June morning when I walked into a Hardware store looking for employment. I had decided to get into a store of some kind, and a friend gave me a hint as to a probable opening in a well-known Hardware establishment.

Many men in the trade have had larger experience than mine, yet in looking back I cannot but recount many changes that have taken place in the different classes of goods handled, the methods of doing business and the growth of Canadian manufacturing interests.

CHANGES.

England at that time had the major share of Canada's Hardware business. Now things are different, as Hardwaremen buy the greater part of their stocks from our own (Canadian) manufacturers, and import from Germany and the United States as well. German Hardware makers have made a bold push for trade within the last ten years, and have been wonderfully successful. In fact unless English makers bestir themselves they will be left behind in the race.

THE BEST WAY TO BUILD UP FOREIGN BUSINESS.

The Germans have agents here who are shrewd salesmen. They are generally men who have served an apprenticeship in a factory or business office in their own country and are well posted in the goods they sell.

They will send home patterns of goods which may be wanted and are able to duplicate them exactly and at prices which are amazingly cheap.

GERMAN VS. ENGLISH MANUFACTURERS.

The trouble with English manufacturers on the other hand is that it is difficult to get them to imitate exactly a given sample. The spirit of John Bull, who is proverbial for notions of his own, seems to have such a grip upon the mentality of the average British manufacturer that he disdains to make an article at variance in style and appearance from those prevailing at home. He has thus lost much trade which has been captured by his more enterprising and astute Teutonic cousin.

A TRIBUTE TO GERMAN CUTLERY.

Even Cutlery, which is supposed to be made of better quality and finish in Sheffield than in any other town on earth, is imported largely to-day from Germany. In Razors they make beautiful goods, and they are gaining a foothold among the trade as reliable goods of superior quality. Also in higher grades of Pocket Knives they are pushing the English competitor hard; while in cheap grades the appearances are decidedly in favor of the German product.

GROWTH OF CANADIAN MANUFACTURES.

LOCKS AND KNOBS.—Seventeen years ago there was not a factory in Canada making the better grades Mortise Locks and Door Knobs. Now there are two factories which make goods equal in style and finish to American makes, and largely control the home market for this class of Hardware. Although the large factories in the States still do some business, their trade is much less than formerly.

PADLOCKS.—In Padlocks, however, the Americans seem to have the trade which a few years back went mostly to England.

CHISELS AND DRAWING KNIVES.—Chisels and Drawing Knives were formerly imported from England and the United States, but are now produced in Canada.

NAILS.—In the Nail trade the change has been most marked. Formerly Iron Cut Nails were used exclusively, and these were followed by Steel Cut Nails, which were considered a step in advance, but Wire Nails have now taken the place of both. I well remember the first Wire Nails which came into our store. They came from Germany and were packed in boxes of 25 pounds each. Now these goods are all made in Canada, there being upward of a dozen Wire Nail factories in the country.

The sale of Clinch Nails, which was quite an item a few years ago, has now dropped off entirely, Wire Nails having taken their place completely. Again the prices at which these goods are sold is no less marvelous. While prices have generally changed much during that period it is only the past year that prices have regained their old time limit.

ALTERED METHODS OF DOING BUSINESS.

The manner of doing business has likewise changed considerably. Wholesale houses, while they employed traveling salesmen at that time, did not rely so much upon their aid as at present. There were many that we called half yearly accounts; men who came to town each spring and fall and paid their old bills and then bought their next six months' supply.

The travelers 17 years ago made about three trips during the year—spring and fall, with a trip between to sell Harvest Tools. Now they are kept on the road almost continuously in order to hold their trade.

To do the same amount of business almost double the effort is required and more expense is incurred, the selling profit of the goods having declined.

RETAILERS LOST OPPORTUNITIES.

Seventeen years ago it was much easier for a retailer who had good credit to buy direct from manufacturers, and consequently at a price more nearly that of the jobber. To-day the retailer cannot buy as low no matter how high his credit, as the present condition of the trade with the various trade associations makes a difference between jobbers' and retailers' buying price.

These organizations in the trade regulate prices largely, and make the buying price of certain lines much more uniform than formerly.

Trade Items.

THE WILLIAM SCHOLLHORN COMPANY, New Haven, Conn., manufacturers of Bernard's Patent Pliers and Tools, advise us that some reports in the daily papers concerning the National Shear Company make it appear that they were involved. They state, however, that they were in no way interested in the National Shear Company, having at its formation sold their Shear business to them outright.

AMERICAN APPRAISAL COMPANY, Milwaukee, Wis., are in receipt of a letter from Wm. T. Wood & Co., manufacturers of Ice Tools, Arlington, Mass., expressing satisfaction with the appraisal of their property recently made. They are convinced that the appraisal would be of great advantage to them in case of a total destruction by fire, while also of considerable use and interest in a general way.

THE MICHIGAN WHEELBARROW & TRUCK COMPANY, Saginaw, Mich., have recently been organized with the following officers: M. O. Robinson, president; G. A. Alderton, vice-president; A. C. Melze, treasurer; Bliss Stebbins, secretary, and C. W. Burrledge, general manager. The company's plant is conveniently situated on the Pere Marquette and Grand Trunk roads and will commence operations about June 1. The output will comprise Hand Carts, Warehouse, Store and Factory Trucks, Bolted Canal, Garden, Stone, Mortar and Steel Tubular Wheelbarrows, Express Wagons, Coal Shutes and Coal Mining Cars.

Catalogue House Competition.

Somewhat more than a year ago the Oxford Hardware Company, Oxford, Ohio, after due deliberation, decided that they would make public announcement of their intention to meet any prices made by catalogue houses on any goods handled by the firm. They accordingly prepared the circular which is given below, which was mailed to their customers with the monthly statements sent out January 1, 1899. Additional publicity for the announcement was secured through the medium of the local paper. As the circular contains a good deal of matter relating to the subject of cash and credit

business and will be suggestive to the trade, we give it in full, in *fac-simile*, reduced in size:



A Bold Announcement!

Read it and you will be convinced of its boldness.

So many people have got to thinking that they can buy cheaper of the department stores and catalogue houses of Chicago, St. Louis, Cincinnati and elsewhere. They think their home merchants charge more than a reasonable profit and in too many cases we are sorry to admit it is true.

Now as we state above we propose to make a bold announcement.

We propose to meet the prices of any of the Department Stores or Catalogue Houses.

All we ask is that you deal with us on the same basis that you deal with the catalogue house, and give us the same amount of time to get the goods which it would require to get them from them. Plank your money down when you order the goods and we will meet each and every price they make and furnish you the same goods at the same price they offer you.

We will go Further,

We don't ask you to take any goods where mistakes are made in ordering. We'll shoulder the mistakes. If any of you have ever had anything come wrong you know what a nice little job it is to get it corrected, no matter how willing the firm is to do so. It takes correspondence, stamps and freight on the goods to get them exchanged, to say nothing of loss of time.

Some people prefer to buy away from home because it sounds big to be able to say they ordered from Chicago, etc. We know of one party who is actually paying more for goods bought away from Oxford than he could buy them of his dealer here. This kind of people we can do nothing for, but the kind who are making the dollar go just as far as they can we can and will do something for.

Give us a trial on the proposition we make if you are one of those who have been buying away from home. Bring your catalogue with you. If we fail to furnish the goods without a reasonable excuse don't give us your confidence again. Try us once. We don't fear the results.

We are residents of Oxford. We are your home merchants. We help pay taxes. We have to live and must consume some of your products.

Is there anything wrong about our Proposition?

The whole trouble with our people about Oxford is the same with which so many communities are suffering. That old slow coach credit. Some of it so slow we never get it. No merchant can sell goods cheap on that plan. The dollar invested in goods today and sold for cash tomorrow can be invested in more goods the following day and the same process of sale may be repeated, but the dollar invested in goods today and sold on credit tomorrow is tied up just so long as you don't get it back, and its earning capacity is stopped for the merchant until he gets it back again. Can you wonder why the catalogue house has the advantage in price over most of your home merchants? The catalogue house won't trust you; even demands the money in advance with no goods in sight. Your home merchant often trusts and often to his sorrow, even though 100% sometimes be his profit. Many times a seeming profit of 25% on goods sold to a good man turns out to be merely a small interest on the money invested because of slow pay.

Treat your home merchant like you are compelled to treat your catalogue house and we think you will get better results.

We handle a full line of Shelf and Heavy Hardware, Stoves, Tinware, Paints, Oils, Varnishes, Window Glass, Etc.

Our store is also the headquarters of Mr. Taylor Beckett who handles

Wagons, Plows, Cultivators, Planters, Drills, Binders, Mowers and a full line of Implements.

Call when in town and make our store your headquarters. We have a few chairs if you want to rest and we keep the store warm and the latch string out.

THE OXFORD HARDWARE CO.,
15 W. High St., Oxford, Ohio.

RESULTS.—The experiment has been successfully continued, and the company refer to the outcome, as follows:

We find this a very satisfactory way to offset the influence of catalogue houses. While we do not stop it entirely (we do not expect to ever reach that point), we have demonstrated to our trade that good articles can be bought right here as cheaply as of these houses, and that trashy goods, which are sent out by these people, are a poor investment at any price. It, however, necessitates our carrying a variety in most kinds of goods to thoroughly demonstrate the point.

Our sales in 1898 were \$16,250, and in 1899, \$20,490, so we think the plan paid. A good trade was a natural result of last year's conditions, but we feel sure a part of it is due to other influences, and somewhat to our own method of handling the department store and catalogue house competition.

We keep their catalogues in our store at all times and allow our customers free access to them. We shall continue the plan.

CONDITIONS.—In reviewing the conditions which led the company to try this plan, they write as follows:

Our town has about 2500 population, with a very fair farming community, but surrounding towns furnish severe competition and the department store is very little worse, so we decided to take it up in this manner. We found these catalogues in almost all of the farmers' hands, and to ignore this fact was the same as an acknowledgment that we could not meet their prices. We had some doubt as to how it would work before issuing the challenge, but after three weeks' trial we decided to again advertise along the same lines the first of the following month. During the first two or three weeks we prevented the sending of three orders to these houses, to our certain knowledge, and in another case sent the order ourselves. The party wanted some Hot Bed Sash. The size and kind were quoted lower by the catalogue house than we had quotations for the same goods, and he would not wait for us to obtain new prices. So we ordered for him. We sold him the glass with which to fill them and kept his trade here, besides creating an impression that we might have received a "divvy" from the catalogue house. We made a profit on the glass and a number of other items which he bought. Had we refused the order for the Sash we would not have gotten any of it, besides losing his estimation of our ability to compete, which we have come to believe is the greatest aid the catalogue houses have.

IMPRESSIONS.—Referring to the impressions made upon the minds of customers by the catalogue houses, and the position which they think merchants should and can take, the Oxford firm write as follows:

The impression produced by the enormous advertising of the catalogue houses has imbued the people with an idea that the catalogue house is the real friend of the consumer and that the local dealer is a robber and gouger. We, as dealers, must overcome these impressions, and we see no other way to do it. To keep silent is equivalent to acknowledging defeat.

We believe, as stated in our advertisements, that any dealer can make the same prices to his customers that the catalogue houses do under precisely the same conditions. We make those who want credit pay for the privilege, and we are very well satisfied with results so far.

Continental Tool Company.

THE trade will observe the advertisement on another page in which the Continental Tool Company, Frankfort, N. Y., call attention to the line of Shovels, Forks, Hoes and Rakes which they are manufacturing. They refer to their large and finely equipped plant and also to the quality, workmanship and style of their product, every tool being fully guaranteed. The company lay special emphasis on the finish of their line of Steel Goods, with which they invite comparison with any on the market, and of which they are making a full assortment. They are at present giving special attention to increasing their output of Shovels as well as of Hay, Manure and Spading Forks, it being difficult for them to keep up with orders on these goods.

The fifth annual meeting of the Texas Hardware Jobbers' Association will be held in Houston on June 18 and 19 next.

Price-Lists, Circulars, &c.

J. H. WILLIAMS & Co., Brooklyn, N. Y.: Drop Forgings. A catalogue just issued illustrates their line of Wrenches, Lathe Dogs, Crank Handles, Vulcan Hoist Hooks, Eye Bolts, Crank Shafts, Thumb Nuts and Screws, Vulcan Chain Pipe Wrench, Rod Ends, Tack Claws and other Forgings. Reference is also made to their fine facilities for the manufacture of special Drop Forgings for Automobiles, Bicycles, Fire Arms, Laundry Machinery, Lawn Mowers, Machine Tools, Sewing Machines, Steam Pumps, &c. Their factory is referred to as equipped with the best appliances for the accurate and economical production of this line, and their working force is composed of skilled and experienced men, which, with a varied stock of materials, enables them to serve customers promptly and well.

THE WINKLEY COMPANY, Madison, Wis.: Illustrated price-list of Winkley's Self Closing, Dust Proof Oil Hole Covers.

UNION MFG. COMPANY, Toledo, Ohio: Woodenware. A catalogue illustrates Churns, Lawn Swings, Washers, Butter Workers, Ironing Tables, Clothes Bars, Washboards, &c. A special catalogue is devoted to Door and Window Screens.

J. R. BAKER & SONS COMPANY, Kendallville, Ind.: Catalogue illustrating and describing Baker's Adjustable Bedside Table, a device designed for the comfort of the sick.

THE CHATTANOOGA WASHING MACHINE & WRINGER COMPANY, Chattanooga, Tenn.: Illustrated price-list of the Light Runner series of Washers and Wringers.

TOLEDO METAL WHEEL COMPANY, Toledo, Ohio: Wire Wheel Goods for children, including Velocipedes, Tricycles, Express and other Wagons, Trucks, Wheelbarrows, Coasters, Doll Cabs, Tandem, &c.

STOUTENBURG MFG. COMPANY, Keithsburg, Ill.: The Cannon Oil, which is referred to as the only Oil Can having a complete force pump attachment, without the use of any packing nuts.

REYNOLDS & Co., New Haven, Conn.: Illustrated price-list of Set, Cap and Machine Screws, Machine Bolts, Coach Screws, &c., and Reynolds' and Hammer's Patent Molding Machines.

FAULTLESS CASTER COMPANY, Nebraska City, Neb.: Catalogue B, illustrating their line of Faultless Patent Casters and Sockets, Patent Insulator Casters and Leather Wheel Casters.

Among the Hardware Trade.

Wiedenbeck, Dobelin & Co., wholesale Heavy Hardware, Madison, Wis., lost their warehouse No. 2 by fire a short time since. The building was entirely destroyed, but the loss was covered by insurance. The firm will erect a fire proof building, 60 x 60 feet, two stories high, on the site of the burned structure.

H. J. Robinson & Co. have succeeded Sackett Bros. in the Hardware, Stove, Agricultural Implement and Furniture business at Weeping Water, Neb.

W. D. Congdon has sold out his Hardware store at Newton, Kan., to Brickler Bros. of Sunny Dale.

Mrs. B. Thompson has purchased the interest of R. S. Thompson in the Hardware firm of Johnson & Thompson, Atlantic, Iowa, and the style continues unchanged.

B. F. Robinson & Co., Mt. Vernon, Iowa, are installing a new plate glass front and a three-story elevator. Additional shelving has also been put in, and the firm have doubled their stock and resources. They refer to business conditions as promising.

S. T. Buckman has disposed of his half interest in the firm of S. T. Buckman & Son, Adel, Iowa, and the style of the house is now Buckman & Bales, W. W. Buckman and O. K. Bales being the partners. Mr. Bales for the past few years has been in the same line at Dexter.

Grebe, Harber & Co., Portland, Ore., consisting of H. Grebe, T. L. Harber and J. F. O'Donnell, have incorporated with a capital stock of \$6000 to carry on the Hardware business at that point.

G. E. Ruhmann & Bro. have succeeded G. E. Ruhmann in the Hardware, Stove and Furniture line at

Shiner, Texas. The firm also manufacture Galvanized Iron Cisterns and do steam fitting and job work.

H. S. Aylsworth & Co., dealers in Hardware, Stoves, Agricultural Implements, Wagons, Buggies, Lumber, Sash, Doors, Lime, &c., Kingman, Ind., have sold out their business to Bonebrake & Carter, who will continue at the old stand.

A. W. Sehorn, Willows, Cal., has disposed of his business, J. P. Klemmer taking the Hardware part and J. D. Daumer the stock of Crockery.

The Milner & Kettig Company, Birmingham, Ala., wholesale Mill and Mining Supplies and Heavy Hardware, are erecting an imposing new building. The structure is situated on the southwest corner of Twentieth street and Railroad avenue, just across the railway tracks from the Union Passenger Station, fronting 106½ feet on Twentieth street, and extending back along Railroad avenue 150 feet to an alley, thus giving it three fronts for light and access. It will be five stories high, with a basement, making six floors, aggregating nearly 100,000 square feet. The first floor on Twentieth street front will be plate glass and iron columns. The remainder of the establishment will be of pressed brick with a belting of stone above the windows of each floor. As nearly all the goods received by this house, and a large portion shipped, are in carload lots, the first floor is to be on a level with a car floor. On the railroad front will be three large doors so arranged that three cars may be handled at the same time, and goods unloaded or loaded into or from either the first floor or basement at the same time. An overhead trolley system will be provided on the first floor for handling heavy machinery, by which one man may take a piece of machinery weighing 10,000 pounds off a car and place it anywhere in the building, or place it on a dray outside. There will be two elevators, one for elevating goods, and the other for lowering them for shipment.

Mullen Hardware Company are successors to Stallman Hardware Company, Sioux Falls, S. Dak.

Miscellaneous Notes.

Farina Saucepans and Rice Boilers.

Keen & Hagerty Mfg. Company, Baltimore, Md., have recently supplemented their assortment of manufactured goods by the addition of complete lines of gray flint enameled ware in farina saucepans and milk or rice boilers, both being double boilers of the regular market patterns. In the farina saucepans the lower vessels have straight sides, the inner vessels having capacities of 2, 3, 4 and 6 quarts each. The milk or rice boilers have flaring bottoms, and the inner receptacles hold 2, 2½, 3½ and 4 quarts respectively. The company are also making a line of sheet iron pans, as follows: A bread pan, each 6 x 10 x 3½, 5 x 9 and 6 x 10 inches, the two latter being shallow; also a cake pan 7½ x 11 and 9 x 9 inches. In addition to their branches in New York, Philadelphia and Chicago, they have now added a salesroom in San Francisco, Cal., at 123 California street, in charge of Jacob Unna.

Hickory Handles.

J. H. Fall & Co., Nashville, Tenn., are putting on the market a line of hickory handles, the product of their factory at Adams Station, Tenn., which is referred to as in the heart of the hickory section of the State. Their list covers axe, pick, sledge, hammer and hatchet handles. They refer to the quality of the wood used in their handles and the fact that they are well finished. They are also in position to make any handles of special design that may be desired.

Flattine Varnish.

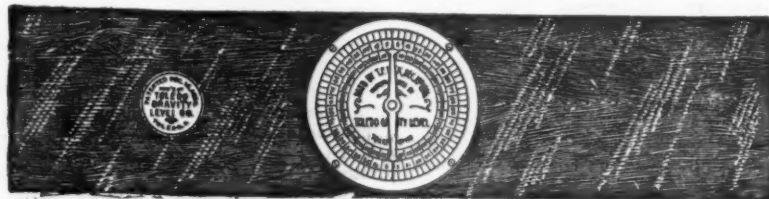
The Standard Varnish Works, 29 Broadway, New York, are just introducing a new process in varnishing, by means of which, they say, a better result is accomplished with all brush work than the customary method of varnishing and rubbing with pumice and oil or water, with a saving of time and hard labor equivalent to about 20 hours in 24 hours of work. In other words, they claim to do in four hours what ordinarily requires 24 hours. They will send to any applicant a hard wood sample finished by their process, the surface of which has a fine dead smooth finish. The wood is first covered with one coat of paste wood filler, then with two coats of Gutta Percha hard oil finish and then with a final coat of var-

nish called Flatline. This leaves four full coats on the wood work, while the regular process puts on three coats and practically rubs off one, thus leaving but two coats on the job. They issue a 16-page illustrated booklet describing the process, and to any desirous of trying Flatline will send a sample free from any of their principal depots in case it is not furnished by the dealer. They may be addressed at 29 Broadway, New York, 2620

for any of the standard cameras. The clamp is made of cast brass, polished and nickel-plated, is $2\frac{7}{8}$ inches long over all and weighs about 14 ounces.

Toledo Gravity Level.

The Toledo Gravity Level Company, Toledo, Ohio, are offering the level shown in the accompanying cut. It is



Toledo Gravity Level.

Armour avenue, Chicago, Ill., or 23 Billiter street, London, England.

The Peerless Laundry Bucket.

The accompanying cut represents a laundry bucket offered by the Peerless Cooker Company, Buffalo, N. Y. The bucket is made of heavy galvanized steel, with a

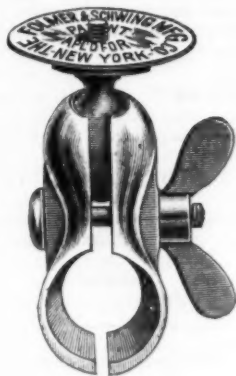


The Peerless Laundry Bucket.

zinc washboard built into one side. It is intended for washing light articles in the home.

Graphic Ball Socket Camera Clamp.

Folmer & Schwing Mfg. Company, 404 Broadway, New York, manufacturers of cameras, lenses and photographic materials, have put on the market the Graphic ball socket camera clamp, here illustrated three-quarters



Graphic Ball Socket Camera Clamp.

size. This device is designed for securing a camera on the handle bar of a bicycle, taking the place of a tripod, but has been advantageously used on limbs of trees for getting lifelike views of birds in their nests, the camera being properly placed and then operated from the ground or other convenient place at the right time by means of a long tube and bulb. It can also be used for other similar purposes according to the ingenuity of the photographer. This forms an adjustable tripod head suitable

governed by a weight carried on friction rolls. The accuracy of the level is the result, it is explained, of gravity practically unimpeded by friction, and that no adjustment is required in either hot or cold weather to insure absolute accuracy. The manufacturers state that the level is neatly and durably made, and is guaranteed by them to give perfect satisfaction. The object of the invention is to provide a new and improved level simple and durable in construction, and so arranged as to indicate automatically horizontal and vertical positions and the angle of any deviation.

Multiple Compartment Guardian Cash Register.

Whiting Mfg. Company, Northborough, Mass., have added to their line of cash registers the one herewith shown. It is designed for use in establishments where it is not desired to know the amounts of separate sales, while providing a register which will give the greatest range of amounts with the smallest number of checks. With it but ten different denominations of checks are used to record all sales from 1 cent to \$9.99, with three compartments, as shown in the cut. Registers with four compartments are made, to order only, using the same number of denominations of checks, to record all sales from 1 cent to \$99.99. The checks as used represent cents, tens of cents, dollars or tens of dollars, according



Multiple Compartment Guardian Cash Register.

to the compartment in which they are placed for recording. When discharged from the carrier they remain separate until sorted and counted. Metal checks are used, $1 \times 1\frac{1}{2}$ inches in size. The sales of different clerks can be accounted by colors, it is explained, as rapidly as with the company's other registers, or the colors can be used for departments; but this register is not well adapted for separating clerks and department sales at the same time. Like all others of the company's registers the cash drawer cannot be opened except by the use of a check. "No Sale" checks are also provided. Two styles of registers are made, one with rack and pinion operated by a crank handle to move the check carrier forward, as shown in the illustration, while in the other style the carrier is operated by a knob on the top of the compartment. They are made to sit on the counter with the drawer opening to the rear, and to order only with the drawer opening to the front. The registers are provided with a bell muffler, and are arranged to be screwed to a shelf or counter, if desired. They are finished in seal grain black with the rack and pinion movement, nickel-plated mountings.

Molders' Rubber Head Draw Hook.

The cut here shown represents a molders' draw hook, put on the market by the Osborn Mfg. Company, Cleveland, Ohio. It is designed for use in foundries where



Molders' Rubber Head Draw Hook.

light castings are made, and is referred to as effecting a great saving.

Buckeye Washing Machine.

The Buckeye Churn Company, Sidney, Ohio, are introducing the washing machine shown herewith. Fig. 1 illustrates the lever handle by which the washer is operated. In Fig. 2 the top of the washer is thrown back, showing a wringer attached. The point is made that

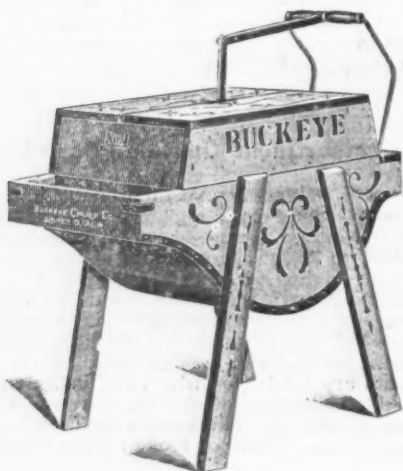


Fig. 1.—Buckeye Washing Machine.

when using the wringer the water runs back into the washing machine. The manufacturers enumerate the following features of excellence possessed by the machine: That it is constructed to give the largest amount of rubbing surface for a small amount of labor; that it

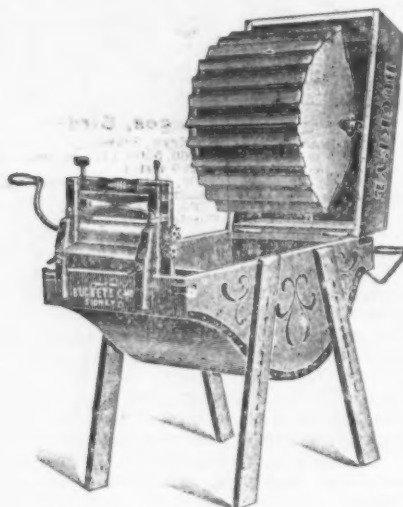


Fig. 2.—Interior of Washing Machine.

is easy to operate; that it will not tear clothes, but washes them perfectly clean; that it adjusts itself to the size of the wash and will wash one shirt as well as more; that it will wash the finest clothes, even lace curtains and fancy needlework, without tearing them, and

better than can be done by hand on a washboard, and that it is simple in construction, with an absence of complicated machinery.

J. P. Ford and H. P. Taylor have formed a partnership at Lacona, N. Y., to carry on the retail business in Hardware, Stoves, Farm Implements, &c. They will also conduct a general repair shop.

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Current Hardware Prices.

REVISED MAY 29, 1900.

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer, are printed in *Italics*, and the prices named represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. They apply to such quantities of goods as are usually purchased by retail merchants. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Cut Prices.—In the present condition of the market there is a good deal of cutting of prices by the jobbing trade, whose quotations are often lower than those of the manufacturers.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE INDEX SUPPLEMENT (May 3, 1900), which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—A new edition of "Standard Hardware Lists" has been issued and contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters Blind—

Domestic, $\frac{1}{2}$ doz. \$3.00.....\$3.50@3.75
North's.....10%
Zimmerman's—See Fasteners, Blind.

Window Stop—

Ives' Patent.....25¢
Taplin's Perfection.....50%

Ammunition—See Caps, Cartridges, Shells, &c.

Anvils—American—

Eagle Anvil.....\$ 7.40@7.75
Hay-Budden, Wrought.....\$ 9.40
Horseshoe brand, Wrought.....\$ 9.40
Samson.....\$ 7.40@7.75
Trenton, Wrought.....\$ 8.40@8.75

Imported—

Armitage's Mouse Hole.....\$4.00@4.25
Peter Wright's.....\$ 9.40@9.75

Anvil, Vise and Drill—

Millers Falls Co., \$18.00.....20%

Apple Parers—See Parers, Apple, &c.

Augers and Bits—

Common Double Spur, 60¢10¢10¢10¢
Boring Machine Augers.....60¢10¢10¢
Car Bits, 12-in. twist.....\$ 60¢10¢10¢
Jennings' Pattern:
Auger Bits.....60¢10¢
Ford's Auger and Car Bits.....40¢10¢40¢10¢10%

Forstner Pat. Auger Bits.....35¢
C. E. Jennings & Co.:
No. 10 ext. lip. R. Jennings' list.....40¢40¢10%

No. 30. R. Jennings' list.....50¢10¢40¢
Russell Jennings.....35¢10¢40¢
L'Hommiedieu Car Bits 15¢10¢15¢10¢5%

Pugh's Black.....30%
Pugh's Jennings' Pattern.....35%
Snell's Auger Bits.....60%
Snell's Bell Hangers' Bits.....50%
Snell's Car Bits, 12-in. twist.....60%
Wright's Jennings Bits (R. Jennings' list).....50%

Bit Stock Drills—

Standard list.....65¢65¢5%

Expansive Bits—

Clark's small, \$18; large, \$20.....50¢10%

Lavigne's Clark's Pattern, No. 1.....\$ 2.00
doz., \$26; No. 2, \$18.....\$16.00
Steer's No. 1, \$20; No. 2, \$18.....40¢40¢35%

Swan's.....90%

Gimlet Bits—

Common Double Cut, gro. \$2.75@3.25
German Pattern.....\$ 3.50@4.50
Double Cut, makers' list.....60¢5¢50¢10%

Hollow Augers—

Ames.....25¢10%
Bonney's Adjustable, $\frac{1}{2}$ doz.....\$16.00
New Patent.....25¢10%
Universal.....20%

Ship Augers and Bits—

Ford's.....40%
Snell's.....40%
L'Hommiedieu's.....15¢10¢15¢10¢10%
Watrous's.....40¢40¢35%

Awl Hafts, See Hafts, Awl.

Awls—

Brad Awls:
Handled.....gro. \$2.75@3.10
Unhandled, Shouldered gro. 65¢60¢
Unhandled, Patent.....gro. 60¢70¢

Peg Awls:
Unhandled, Patent.....gro. \$1@1.50
Unhandled, Shouldered gro. 65¢70¢
Scratch Awls:
Handled, Common, gro. \$3.50@4.00
Handled, Socket, gro. \$11.50@12.00

Awl and Tool Sets—See Sets, Awl and Tool.

Axes

First Quality, best brands, \$5.25@5.50
First Quality, other brands, \$5.00@5.25
Jobbers' Special Brands:
Good Quality.....\$5.00@5.50
Best Quality.....\$5.25
Cheap, Handled Axes.....\$5.50@5.75
Beveled, add 25¢ doz.

Axe Grasse—See Grasse, Axe.

Axles—

Concord, loose collar.....6¢6 c
Concord, solid collar.....6¢6 c
No. 1 Common.....5 c 6¢
No. 1 & 4 Com. New Style.....5¢6 c
No. 2, Solid Collar.....5¢6 c
Nos. 7, 8, 11 to 14.....50¢10%

Nos. 7, 8, 11 to 14, 100 sets.....60%
Nos. 15 to 18.....60%
Nos. 19 to 22.....60¢10%

Boxes, Axle—

Common and Concord, not turned.....lb. 5c
Common and Concord, turned.....lb. 6c
Half Patent.....lb. 9c

Balances—

Caldwell new list.....50%
Fullman's.....62½%

Spring—

Spring Balances.....50¢50¢5%
Chatillon's Light Sps. Balances.....40¢10%

Chatillon Straight Balances.....40%
Chatillon Circular Balances.....50%
Chatillon's Large Bal.....30%

Barb Wire—See Wire, Barb.

Bars—Crow—

Steel Crowbars, 10 to 50 lb., per lb.....4¢4½¢

Beams, Scale—

Scale Beams, List Jan. 12, '98.....30¢30¢5%

Chatillon's No. 1.....30%
Chatillon's No. 2.....40%

Beaters—Egg—

Standard Co.:
No. 5 Steel Handle Diver, $\frac{1}{2}$ gro. \$8.50
No. 10 Cast Handle Diver, $\frac{1}{2}$ gro. \$8.00
No. 10 Steel Handle Diver, $\frac{1}{2}$ gro. \$8.00
No. 15 Extra Heavy Steel Handle.....\$15.00

Rival, $\frac{1}{2}$ gro. \$15.00
Taplin Mfg. Co.:
No. 50 Small Family size.....\$4.50
No. 100 Regul. r Family size.....\$5.00
No. 102 Regul. r Family size, tinued.....\$9.50

No. 150 Large Family size.....\$11.00
No. 152 Large Family size, tinued.....\$17.00

Lyon's, Standard size.....\$ 2.75
Wonder (S. S. & Co.).....\$ 2.75

Bellows—

Blacksmith—
Standard list.....70¢70¢5%

Inch.....30 32 34 36 38 40
Each, \$3.70 3.95 4.25 4.50 4.75 5.00
Extra Length:
Each, \$4.25 4.50 4.75 5.00 5.25 5.50 5.75

Molders—

Inch.....9 10 11 12 14 16
Doz.....\$6.75 7.25 8.50 9.50 12.00 14.50

Hand—

Inch.....6 7 8 9 10 12
Doz.....\$3.75 4.25 4.50 5.00 5.75 6.75

Bells—Cow—

Ordinary goods.....75¢10%
High grade.....70¢70¢10%
Jersey.....75¢75¢10%
Texas Star.....50¢10%

Door—

Barton Gang.....55%
Gong, Yankee.....55%
Home, R. & E. Mfg. Co.'s.....50¢10%
Lever and Pull, Sargent & Co.'s.....33%10%

Hand—

Hand Bell, Polished.....65¢65¢10%
White Metal.....65¢65¢10%
Nickel Plated.....50¢50¢10%
Swiss.....80¢80¢10%

Miscellaneous—

Farm Bells.....lb 2@3¢
Steel Alloy Church and School.....50¢10¢90%
Willmot & Hobbs Mfg. Co., Gong.....70%

Belt—

Common Standard.....70¢10¢75%
Standard.....60¢10¢70%
Extra.....60¢60¢10%
High Grade.....60¢60¢10%

Leather—

Extra Heavy, Short Lap.....50¢10¢50¢10¢5%
Regular Short Lap.....60¢60¢10%
Standard.....60¢10¢60¢10¢5%
Light Standard.....70%

Cotton—

Rossendale-Reddaway B. & H. Co.:
Sphinx Brand.....60¢10%
Durable Brand.....70%

Bench Stops—See Stops, Bench

Benders and Upsetters, Tire—

Green River Tire Benders and Upsetters.....30%
Ill. Iron & Bolt Co.....40¢40¢5%
Stoddard's Lightning Tire Upsetters.....40¢50%

Bicycle Goods—

Lane's Cycle Hanger.....33½¢5%
John S. Leag's Son's 1899 list:
Falls.....50%
Paris.....50%
Spokes.....50%
Tub.....60%

Bits—

Auger, Gimlet, Bit Stock Drills, &c.—
See Augers and Bits.

Bit Holders—See Holders.

Blind Adjusters—See Adjusters, Blind.

Blind Fasteners—See Fasteners, Blind.

Blind Staples—See Staples, Blind.

Blocks—Tackle—

Common Wooden.....70¢70¢10%
Cleave & id Steel.....50¢10¢80¢10%
Eddy's Steel.....60¢10%
Hartz Steel.....50¢10%
Ford's Star Brand Self Lubricating.....60¢10%

Hollow Steel, Ford's Pat. Star Brand.....50¢10%

Lane's Patent Automatic Lock and Junior.....30%
Stowell's Novelty, Mail Iron.....50%

See also Machines, Hoisting.

Boards, Stove—

Zinc, Crystal, &c.....50¢50¢10%

Bolts—

Carriage, Machine, &c.—
Common list Jan. 30, '98.....60¢10¢
Norway Iron, \$3.00, list Oct. 7, '94.....75¢75¢10%

Phila. Eagle, \$3.00, list May 25, '99.....75¢10¢75¢10¢5%

Bolt Ends, list Jan. 30, '95.....60¢10¢10¢
Machine, list Oct. 1, '99.....60¢10¢10¢

NOTE.—Jobbers' prices on Bolts are now generally lower than manufacturers'.

Door and Shutter—

Cast Iron Barrel, Round Brass Knob:
Inch.....3 4 5 6 8
Per doz.....\$0.35 .50 .65 .75 .80

Cast Iron Spring Foot:
Inch.....6 8 10
Per doz.....\$1.00 1.25 1.75

Cast Iron Chain, Flat, Japanned:
Inch.....6 8 10
Per doz.....\$0.35 1.20 1.50

Cast Iron Shutter, Brass Knobs:
Inch.....6 8 10
Per doz.....\$0.60 .80 1.15

Wrought Barrel Brass Knob:
Inch.....3 4 5 6 8
Per doz.....\$0.45 .50 .61 .70 1.23

Wrought Barrel.....70¢10¢75¢5%
Wrought.....Bronzed, 10¢5¢50¢10%
Wrought Flush, B. K., 50¢10¢60¢10%
Wrought Shutter.....40¢10¢10¢60¢5%
Wrought Square Neck.....50¢50¢10%
Wrought Sunk.....50¢50¢10%
Ives' Patent Door.....42½¢60¢40%

Stove and Plow—

Pine.....50¢10¢60%
Stove.....60¢60¢10%

Tire—

Common.....60¢60¢10%
American Spring Company.....70%
Norway Phila., list Oct. 16, '94.....70%
Eagle Phila., list Oct. 16, '94.....72½%
Bay State, list Dec. 28, '90.....57%
Franklin Moore Co.:
Norway Phila., list Oct. 16, '94.....70%
Eagle Phila., list Oct. 16, '94.....72½%
Eclipse, list Dec. 28, '90.....57%
Port Chester Bolt & Nut Company:
Empire, list Dec. 28, '90.....57%
Keystone Phila., list Oct. '94.....72½%
Norway Phila., list Oct. '94.....70%

Borers, Tap—

Borers Tap, Ring, with Handle:
Inch.....1¼ 1½ 1¾ 2
Per doz.....\$3.50 4.50 5.00 6.50

Inch.....2½ 3 3½ 4
Per doz.....\$7.50 10.25 12.50 15.00

Enterprise Mfg. Co., No. 1, \$1.25; No. 2, \$1.65; No. 3, \$2.50 each.....25¢30%

Boring Machines—See Machines, Boring.

Boxes, Mitre—

Seavey's, per doz., \$30.....40%

Braces—

NOTE.—Most Braces are sold at net prices.

Common Ball, American.....\$1.10@1.50
Barber's.....50¢10¢80¢10%
Fray's Genuine Spofford's.....50¢10¢5%
Fray's No. 70 to 120, 81 to 123, 207 to 414.....50¢10¢5%
P. S. & W. Co., Peck's Patent.....50¢10¢80%

Brackets—

Cast Iron, plain.....60¢10¢70¢10%
Wrought Steel.....70¢5¢70¢10%
Bradley's Wire Shelf:
Full cases.....75¢10%
Broken cases.....75%

Bright Wire Goods—See Wire and Wire Goods.

Broilers—

Wire Goods Co.....70¢70¢10%

Buckets, Well and Fire—

See Pails

Bucks, Saw—

Booster.....\$ 36.00

Bull Rings—See Rings, Bull.

Butts—Brass—

Wrought list Sept., '96.....25¢5¢35%
Cast Brass, Tiebout's.....50%

Cast Iron—

Fast Joint, Broad.....50¢5%
Fast Joint, Narrow.....50¢5%
Loose Joint.....60¢5¢70%
Loose Pin.....60¢5¢70%
Mayer's Hinges.....60¢5¢70%
Parliament Butts.....60¢5¢70%

NOTE.—Jobbers often understate manufacturers'.

Wrought Steel—

Loose Joint.....50¢5%
Table and Back Flaps.....30%
Narrow and Broad.....70¢5%
Inside Blind.....70¢5%
Loose Pin, Ball and.....70¢10%
Loose Pin, Ball and.....70¢10%

Steeple Tip

Bronzed Wrt. Nar. and Inside Blind Butts.....50¢10¢50¢10¢5%

Cages, Bird—

Handy, Brass:
\$200, 5000, 1100 series.....5%
1200 series.....50%
200, 300, 400 and 900 series.....40¢10%
Handy, Bronze:
700, 800 series.....40¢10%
Handy, Enamelled.....40¢10%

Callipers—See Compasses.

Calks, Toe and Heel—

Blunt.....per lb. 5¢@5½¢
Sharp.....per lb. 5¢@5½¢
Perkins' Blunt.....\$ 5
Perkins' Sharp.....\$ 5½

Can Openers—See Openers, Can

Cans, Milk—

Buffalo Pattern: 5 8 10 gal.
\$3.60 \$4.00 .83½%
Illinois Pattern.....2.4 3.10 3.50 .33½%
Iowa Pattern.....2.4 3.35 3.75 .33½%
New York Pattern.....3.00 4.35 4.60 .33½%
Baltimore P. T. r'n 3.10 4.45 4.70 .33½%

Cans, Oil—

Galvanized Blue Band, 1-gal., $\frac{1}{2}$ doz. \$1.75@2.00
S. S. & Co., Galvanized Family with faucet, 3-gal., $\frac{1}{2}$ doz. \$5.40
Glass Oil..... $\frac{1}{2}$ doz. \$1.90@2.25

Caps—Percussion—

Eley's E. B.....50¢
G. D.....per M 35¢35¢
F. L.....per M 37¢40¢
G. E.....per M 47¢50¢
Musket.....per M 57¢60¢

Primers—

Berdan Primers, \$1.00.....6%

Cimlets—

Nail, Metal, Assorted, gro. \$1.50 @ 1.75
Spike, Metal, Assorted, gro. \$3.00 @ 3.50
Nail, Wood Handled, Assorted,
gro. \$1.00 @ 1.25
Spike, Wood Handled, Assorted,
gro. \$3.00 @ 3.50

Glass, American Window

List Jan 1, 1898.

Small lots from store:

Single, Eastern.
First Bracket.....85%
Second and Third Brackets.....85%
Eastern, All Other Brackets.....85%
Double, Eastern.
First Bracket.....85%
Second, Third, Fourth and Fifth
Brackets.....85%
All Other Brackets.....85%
From Jobbers or Factory, with Freight
Allowance, except in Eastern district:
Carloads, Single Strength.
First Bracket.....85%
Second and Third Brackets.....85%
All Above.....90%
Carloads, Double Strength.
First Five Brackets.....85%
60 inch Bracket.....90%
70 to 100 inch Bracket, inclusive
90%
All Above.....90%

Glue—Liquid, Fish—

List A, Bottles or Cans, with Brush.

List B, Cans (½ pts., pts., qts.).

List C, Cans (½ gal., gal.).

Glue Pots—See Pots, Glue.**Grease, Axle—**

Common Grade.....gro. \$5.00 @ 6.00

Allerton's Axle:

10 lb. Tins, ½ gr.....\$9.00

10 lb. Tin Pails, ½ doz., \$2.00; 5 lb., \$1.00;

10 lb., \$6.00. ½ doz. \$12.00

Dixon's Everlasting.....10 lb. pails, on 85%

Dixon's Everlasting, in bxs., ½ doz. 1 lb.

1 lb. \$1.20; 2 lb. \$2.00

Grindstone Fixtures—

See Fixtures, Grindstone.

Gun Powder—See Powder.**Hack Saws—See Saws.****Hafis, Awi—**

Peg Patent, Leather Top.....\$4.00 @ 5.25

Peg Patent, Plain Top.....\$3.50 @ 5.75

Sewing, Brass Ferrule.....\$1.50 @ 1.60

Saddlers', Brass Ferrule.....\$1.35 @ 1.45

Peg, Common.....\$1.25 @ 1.35

Brad, Common.....\$1.50 @ 1.75

Halters and Ties—

Covert Mfg. Co., Web.....45¢ @ 25¢

Covert Mfg. Co., Jute Rope.....45¢ @ 25¢

Covert Mfg. Co., Sisal Rope.....30¢ @ 25¢

Covert's Saddlery Works, 96 list, W. B. 100

Covert's Saddlery Works, Leather 60¢ @ 10¢

Covert's Saddlery Works, Jute.....60¢ @ 10¢

Covert's Saddlery Works, Sisal.....60¢ @ 10¢

Covert's Saddlery Works, Manila.....60¢ @ 10¢

Covert's Saddlery Works, Cotton.....70¢ @ 10¢

Hammers—**Handled Hammers—**

Heller's Machinists.....50¢ @ 50¢

Heller's Machinists.....50¢ @ 50¢

Magnetic Tack, Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000

Pulleys—

Hay Fork, Swivel or Solid Eye doz. \$1.60 to \$3.00
 Hay Fork, Stowell's Anti-Friction, 5-in. Wheel, # doz. \$12.00 40%
 Hot House, Awning, # doz. \$6.00 to \$10.00 60% to \$10%
 Japanned Clothes Line 60% to \$10%
 Japanned Screw 70% to \$10%
 Japanned Side 70% to \$10%
 Stowell's Culling End, Anti-Friction 60%
 Stowell's Dumb Walter, Anti-Friction 60% to \$10%
 Stowell's Electric Light 60%
 Stowell's Side, Anti-Friction 60% to \$10%

Sash Pulleys—

Common Sense, 1 1/2 in. # doz. 20%
 2 in. 32%
 Empire 1 1/2 in. 17% 2 in. 19%
 Grand Rapids All Steel Noiseless 40%
 Ideal No. 13 1 1/2 in. # doz. 20%
 Improved 1 1/2 in. 17% 2 in. 19%
 Niagara 1 1/2 in. 16% 2 in. 19%
 No. 30, Troy 1 1/2 in. 16% 2 in. 19%
 Star 1 1/2 in. 16% 2 in. 19%
 Ace 1 1/2 in. 16% 2 in. 19%
 Fox-All-Steel, Nos. 3 and 7, 2 1/2 in. # doz. 25%
 No. 9, 1 1/2 in. # doz. 25%
 Extra for Plated Finish # doz. 30%
 Extra for Anti-Friction Bronze # doz. 10%
 Tackle Blocks—See Blocks.

Pumps—

Cistern 60% to \$10%
 Pitcher Spout 70% to \$10%
 Pump Leathers, all sizes gro. \$6.00
 Barnes Dbl. Acting (low lift) 60%
 Flint & Walling's Fast Mail 50% to \$5%
 Flint & Walling's Iron Spout, 70% to \$10%
 Loud's Suction Pumps, U. S. Co. 20%
 Mover's Pump, low lift 60%
 Contractors' Rubber Diaphragm Non-chokable, B. & L. Block Co. 30%

Punches—

Revolving (4 tubes) doz. \$1.00 to \$1.50
 Saddlers' or Drive, good doz. 65% to 70%
 Spring, good quality \$3.00 to \$3.25
 Bemis & Call Co.'s Check 65%
 Bemis & Call Co.'s Spring 60%
 Niagara Hollow Punches 45%
 Niagara Solid Punches 55%
 Spring, Leach's Pat. 15%
 Steel Screw, B. & L. Block Co. 40%
 Tinnin's Hollow, P. S. & W. Co. 55% to \$1.44
 Tinnin's Solid, P. S. & W. Co. # doz. \$1.44 55%

Rail—

Barn Door, &c.—
 Barn Door, Light, 1/2 in. 1/4 3/4 1/2 3/4 100 feet \$2.00 to \$2.50 \$3.00
 B. D. for N. E. Hangers: Small, Med. Large, 100 feet \$2.30 \$2.70 \$3.20
 Sliding Door, Bronzed Wrt Iron, ft. 6 1/4 c
 Sliding Door, Iron Painted, 1/4 in. 3/4 in. 1 in. 1 1/4 in. 1 3/4 in. 2 in. 2 1/4 in. 2 3/4 in. 3 in. 3 1/4 in. 3 3/4 in. 4 in. 4 1/4 in. 4 3/4 in. 5 in. 5 1/4 in. 5 3/4 in. 6 in. 6 1/4 in. 6 3/4 in. 7 in. 7 1/4 in. 7 3/4 in. 8 in. 8 1/4 in. 8 3/4 in. 9 in. 9 1/4 in. 9 3/4 in. 10 in. 10 1/4 in. 10 3/4 in. 11 in. 11 1/4 in. 11 3/4 in. 12 in. 12 1/4 in. 12 3/4 in. 13 in. 13 1/4 in. 13 3/4 in. 14 in. 14 1/4 in. 14 3/4 in. 15 in. 15 1/4 in. 15 3/4 in. 16 in. 16 1/4 in. 16 3/4 in. 17 in. 17 1/4 in. 17 3/4 in. 18 in. 18 1/4 in. 18 3/4 in. 19 in. 19 1/4 in. 19 3/4 in. 20 in. 20 1/4 in. 20 3/4 in. 21 in. 21 1/4 in. 21 3/4 in. 22 in. 22 1/4 in. 22 3/4 in. 23 in. 23 1/4 in. 23 3/4 in. 24 in. 24 1/4 in. 24 3/4 in. 25 in. 25 1/4 in. 25 3/4 in. 26 in. 26 1/4 in. 26 3/4 in. 27 in. 27 1/4 in. 27 3/4 in. 28 in. 28 1/4 in. 28 3/4 in. 29 in. 29 1/4 in. 29 3/4 in. 30 in. 30 1/4 in. 30 3/4 in. 31 in. 31 1/4 in. 31 3/4 in. 32 in. 32 1/4 in. 32 3/4 in. 33 in. 33 1/4 in. 33 3/4 in. 34 in. 34 1/4 in. 34 3/4 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Shovels and Tongs—

Brass Head.....60¢50¢60¢10¢
Iron Head.....60¢50¢60¢10¢

Sieves and Sifters—

Hunter's Imitation, gro. \$11.00@12.00
Buffalo Metallic Blue'd S. S. & Co., gr.:
142 10 16 18 18 20
\$12.90 \$13.80 \$15.00
Eclipse.....gr. \$10.00
Electric Light.....gr. \$12.00
Hunter's Genuine.....gr. \$12.50
Shaker (Barler's Pat.) Flour Sifters.....
\$ doz., \$3.00.....35¢

Sieves, Wooden Rim—

Nested, 10, 11 and 12 Inch.
Mesh 18, Nested, doz.....\$0.75@0.80
Mesh 20, Nested, doz.....85¢@.90
Mesh 24, Nested, doz.....1.00@1.05

Sinks—

Low list.....50¢10¢60¢
NOTE.—The low list is now generally
used, but some jobbers use high list.

Wrought Steel—

Columbus Galv'd and Enamelled, 60¢5¢
Columbus, Painted.....45¢
L. & G.....50¢

Skeins, Wagon—

Cast Iron.....70¢70¢10¢
Malleable Iron.....40¢10¢50¢
Steel.....35¢35¢45¢
I. I. & B. Co. Steel.....35¢

Slates—

"D" Slates.....50¢10¢50¢10¢10¢
Unexcelled Noiseless Slates.....
60¢5¢10¢50¢10¢50¢
Wire Bound.....40¢10¢50¢
Double Slates, add \$1 case, net.

Slaw Cutters—See Cutters.

Slicers, Vegetable—
Sterling \$2.00.....33¢5¢

Snaps, Harness—

German.....40¢40¢10¢
Covert Mfg. Co.:
Jockey.....35¢35¢
High Grade.....45¢35¢
Jockey.....45¢35¢
Trojan.....45¢35¢
Covert's Saddlery Works:
Banner.....80¢10¢
Crown.....80¢10¢
Triumph.....80¢10¢
W. & E. T. Fitch Co.:
Bristol.....40¢10¢
Empire.....50¢50¢
German.....40¢
National.....50¢50¢
Perfect.....45¢
Clipper.....50¢50¢
Champion.....40¢
Security.....40¢
Victor.....40¢50¢
Oral.....40¢50¢
Solid Steel.....65¢65¢10¢
Sole Swivel.....40¢10¢10¢
Sargent's Patent Guarded.....
60¢50¢60¢10¢

Snaths—

Scythe.....45¢5¢

Snips, Tinnners'—See Shears.**Soldering Irons—**

See Irons, Soldering.

Spoke Trimmers—

See Trimmers, Spoke.

Spoons and Forks—

Silver Plated—
Flat Ware.....50¢10¢60¢10¢
Wm. Rogers' Mfg. Co.....50¢10¢

Miscellaneous—

German Silver.....60¢10¢
Wm. Rogers Mfg. Co.:
18¢ German Silver.....60¢
Rogers' Silver Metal.....50¢10¢

Springs—

Door—
Gem (Coil).....20¢
Star (Coil).....30¢
Torrey's Rod, 30 in., \$ doz. \$1.10@1.25
Warner's No. 1, \$ doz. \$1.50; No. 2,
\$3.40.....55¢55¢10¢
Victor (Coil).....60¢10¢60¢10¢50¢

Carriage, Wagon, &c.

Factory Shipments.
1 1/4 in. and wider.....Blk. Hf Brt. Brt.
Tested and Temp 5/4 5/4 5/4c lb
Oil Tested and
Tempered.....6/4 6/4 6/4c lb
Cliff's Bolster Springs.....35¢
Cliff's Seat Springs.....pair 55¢

Sprinklers, Lawn—

Enterprise.....25¢30¢
Philadelphia No. 1, \$ doz. \$12; No. 2,
\$18; No. 3, \$24.....30¢

Squares—

Nickel plated.....List Jan. 5, 1900
Steel and Iron.....75¢
Rosewood tidl. Try Square and T-
Bevels.....60¢10¢10¢70¢
Iron Hdl. Try Squares and T-Bevels,
10¢10¢10¢10¢10¢

Squeezers—

Lemon—
Wood, Common, gro., No. 1, \$2.25
@ \$5.50; No. 1, \$6.25@ \$6.50.
Wood, Porcelain Lined:
Cheap.....doz. \$3.00@2.75
Good Grade.....doz. \$3.00@3.50

Tinned Iron.....doz. \$0.75@1.25
Iron, Porcelain Lined do. \$0.90@1.25
Jennings' Star.....\$ doz. \$1.85@1.90
King.....\$ doz. \$2.00

Staples—

Barbed Blind.....lb. 9¢10¢
Electricians' Association list.....75¢10¢
Fence Staples, same price as Barbed
Wire. See Trade Report.
Poultry Netting.....80¢10¢
Grand Crossing Tack Co.'s list.....75¢10¢

Steels, Butchers'—

Dick's.....40¢
Foster Bros'.....30¢
C. & A. Hoffmann's.....50¢
Nichols Bros.....50¢

Steelyards—

Blacksmiths'.....40¢40¢10¢

Stocks and Dies—

Gardner.....40¢40¢10¢
Green River.....25¢
Lightning Screw Plate.....25¢
Little Giant.....25¢
Reece's New Screw Plates.....25¢30¢
Grand Reversible Ratchet Die Stock.....25¢

Stone—

Scythe Stones—
Pike Mfg. Co., list '95-'98.....33¢45¢
Cleveland Stone Co., list Nov., '98.....33¢45¢

Oil Stones, &c.

Pike Mfg. Co.:
Hindustan No. 1, \$ doz. 85¢
Sand Stone.....5¢ 33¢45¢
Turkey Oil Stone, Extra.....33¢45¢
5 to 5 lb.....\$1.50
Turkey Slips.....90¢
Lilly White Washita.....60¢
Rosy Red Washita.....60¢
Washita Stone, Extra.....50¢
Washita Stone, No. 1.....40¢
Washita Stone, No. 2.....30¢
Lilly White Slips.....90¢
Rosy Red Slips.....90¢
Washita Slips, Extra.....80¢
Washita Slips, No. 1.....70¢
Arkansas Stone, No. 1, 3 to 5 in. \$ doz. 35¢
Arkansas Stone, No. 1, 5 to 8 in. \$ doz. 35¢
India Oil Stones.....25¢30¢
Tanite Mills.....25¢30¢
Emery Oil, \$ doz. \$3.00.....50¢60¢

Stoners—

Cherry—
Enterprise.....25¢30¢

Stops, Bench—

Millers Falls.....15¢10¢
Morrell's.....\$ doz. No. 1, \$10.00; No. 2,
\$11.00, 40¢20¢

Stops, Window—

Ives' Patent.....45¢5¢
Taplin's.....45¢
Wilcox, Steel, per doz., \$0.00.....50¢

Stove Boards—

See Boards, Stove.

Stove Polish—See Polish, Stove.**Straps, Box—**

Cary's Universal case lots.....20¢10¢

Stretchers, Carpet—

Cast Iron, Steel Points.....doz. 55¢65¢
Cast Steel, Polished.....doz. \$2.25
Socket.....doz. \$1.75

Stuffers, Sausage—

Miles' Challenge, \$ doz. \$20.....50¢50¢5¢
Enterprise Mfg. Co.....35¢35¢7¢5¢
National Specialty Mfg. Co., list Jan.
1, '97.....30¢

Tacks, Brads, &c.—

See Trade Report.
List Jan. 15, '99.
Carpet Tacks, American.....90¢10¢
American Cut Tacks.....90¢30¢
Swedes Iron Tacks.....90¢20¢
Swedes Upholsterers' Tacks.....50¢10¢

Gimp Tacks.....90¢10¢
Lace Tacks.....90¢20¢
Trimmers' Tacks.....90¢30¢
Looking Glass Tacks.....70¢10¢
Bill Posters' and Railroad Tack.....90¢20¢
Hungarian Nails.....80¢25¢
Common and Patent Brads.....70¢10¢
Trunk and Clout Nails.....60¢
NOTE.—The above prices are for
Straight Weights. An extra 5¢ is given
Star Weights and an extra 10¢ is on
Standard Weights.

Miscellaneous—
Double Point Tacks.....\$¢4 or 5¢ tens
Steel Wire Brads, R. & E. Mfg.
Co.'s list.....50¢10¢60¢
See also Nails, Wire.

Tanks, Oil—

Emerald, S. S. & Co.....30-gal. \$3.20
Emerald, S. S. & Co.....60-gal. \$4.00
Queen City S. S. & Co., 0-gal.....\$3.50
Queen City S. S. & Co., 60-gal.....\$4.25

Tapes, Measuring—

American Asses' Skin.....10¢10¢50¢
Patent Leather.....\$5@20¢5¢
Steel.....10¢10¢5¢
Chesterman's.....25¢25¢5¢

Eddy's Steel.....40¢10¢5¢
Eddy's Metallic.....35¢5¢10¢5¢
Keuffel & Esser Co., Steel and Metallic.....35¢
Lower list, 1899.....35¢
Lufkin's Steel.....33¢35¢
Lufkin's Metallic.....30¢35¢

Thermometers—

Tin Case.....80¢80¢10¢

Ties, Bale—Steel.

Standard Wire.....50¢10¢5¢

Ties, Wall—

Cleveland, Steel.....\$ 1000, \$10.00

Tinners' Shears, &c.—

See Shears, Tinnners', &c.

Tinware—

Stamped, Japanned and Pieced, sold
very generally at net prices.

Tire Benders, Upsetters,

&c.—See Benders and Upset-
ters, Tire.

Tobacco Cutters—

See Cutters, Tobacco.

Tools—

Coopers'—
L. & I. J. White.....30¢90¢5¢
Saw—
Atkins' new list.....40¢
Simonds' Improved.....33¢45¢
Simonds' Crescent.....25¢

Ship—

L. & I. J. White.....25¢

Transom Lifters—

See Lifters, Transom.

Traps—Game—

Oneida Pattern.....70¢10¢75¢10¢
Hawley & Norton.....65¢5¢70¢
Victor (Oneida Pattern).....75¢75¢10¢
Star (Blake Pattern).....65¢10¢70¢5¢

Mouse and Rat—

Mouse, Wood, Choker, doz. holes, 9@10¢
Mouse, Round or Square Wire.....
doz. \$0.85@1.00

Marty French Rat and Mouse Traps

(Genuine):
No. 1, Rat, \$ doz. \$12.00; case of 24,
\$10.50
No. 3, Rat, \$ doz. \$5.50; case of 50,
\$5.00
No. 3 1/2, Rat, \$ doz. \$1.50; case of 72,
\$1.00
No. 4, Mouse, \$ doz. \$3.50; case of 72,
\$2.75
No. 5, Mouse, \$ doz. \$2.75; case of 150,
\$2.25

Schuyler's Rat Killer, No. 1, \$ gr. \$30.00;
No. 2, \$ gr. \$30.00; Mouse, No. 3,
\$18.00.....35¢
Out o' Sight Mouse, No. 1, \$ doz. 60¢
Rat, No. 2, \$1.25; Mice, \$0.00,
Gopher, \$1.50; Stop Thief, No. 1,
\$1.25; No. 2, \$1.50.

Fly—

Balloon, Globe or Acme.....
doz. \$1.15@1.25; gr. \$12.00@14.00
Harper, Champion or Paragon
doz. \$1.25@1.40; gr. \$13.50@15.00

Trimmers, Spoke—

Bonney's Nos. 1 and 2.....40¢
Stearns.....25¢

Trowels—

Diamond Brick and Pointing.....30¢
Diamond Plastering.....25¢
Diamond "Standard Brand" and Au-
den Trowels.....40¢
Never-Break Steel Garden Trowels.....
gr. \$7.00

Peace's Plastering.....30¢
Rose Brick and Plastering.....25¢5¢
Woodruff & McFarlin, Plastering.....25¢10¢

Trucks, Warehouse, &c.—

R. & L. Block Co.'s list.....40¢
Daisy Stove Trucks, Improved pattern
\$ doz. \$21.00

Tubs, Wash—

No. 1 \$ 3
Galvanized, per doz. \$5.00 5 50 6.00
Galvanized S. S. & Co., with Wringer
Attachment, \$ doz. No. 10, \$7.35
No. 20, \$7.75; No. 30.....\$8.25

Twine—

Blender—
Carload lots f.o.b. New York, Phila-
delphia or Boston.
White Stail, 500 ft. to lb. per lb. 11 c
Standard, 500 ft. to lb. per lb. 11 c
Manila, 600 ft. to lb. per lb. 11 c
Pure Manila, 650 ft. to lb. per lb. 15¢4¢
Less than carloads add 1/4¢ per lb.

Miscellaneous—

Flax Twine— BC B.
No. 2, 1/4 and 1/2-lb. Balls.....25¢ 26¢
No. 12, 1/4 and 1/2-lb. Balls.....25¢ 26¢
No. 18, 1/4 and 1/2-lb. Balls.....16¢ 15¢
No. 24, 1/4 and 1/2-lb. Balls.....16¢ 15¢
No. 36, 1/4 and 1/2-lb. Balls.....16¢ 15¢
Chalk Line, Cotton, 1/2-lb. Balls.....18¢20¢

Cotton Mops, 6, 9, 12 and 15 lb. 10
doz.....7¢8¢
Cotton Wrapping, 5 Balls to lb.....9¢15¢

American 2-Ply Hemp, 1/4 and 1/2-lb.
Balls.....12¢13¢
American 3-Ply Hemp, 1-lb. Balls.....12¢13¢

India 2-Ply Hemp, 1/4 and 1/2-lb.
Balls (Spring Twine).....10¢
India 3-Ply Hemp, 1-lb. Balls.....10¢
India 3-Ply Hemp, 1 1/2-lb. Balls.....10¢
2, 3, 4 and 5-Ply Jute, 1/2-lb. Balls.....80¢9¢

Mason Line, Linen, 1/2-lb. Balls.....45¢
No. 864 Mattress, 1/4 and 1/2-lb. Balls.....35¢
Wool.....7¢

Vises—

Solid Box.....50¢50¢15¢
Bonney's Saw Vises.....40¢10¢

Parallel—

Athol Machine Co.:
Simpson's Adjustable.....40¢
Standard.....40¢
Amateur.....25¢
Bonney's.....40¢10¢
Fisher & Norris Double Screw.....15¢10¢
Holland's.....40¢40¢10¢
Lewis Tool Co.....20¢40¢
Massey's Perfect.....15¢20¢
Massey's Clincher.....30¢40¢
Merrill's.....20¢
Miller's Falls.....low list 10¢

Parker's:
Victor.....20¢25¢
Regulars.....20¢25¢
Vulcan's.....40¢45¢
Combination Pipe.....35¢60¢
Prentiss.....20¢25¢
Sargent's.....40¢
Simpson's Adjustable.....49¢
Snediker's X. L.....20¢25¢
Stephens.....20¢25¢
Tales' Woodworking.....25¢
Van, W. & Hdw. Co.....40¢

Saw Filers—
Bonney's No. 1, \$13; No. 3, \$6.50@10¢
Dixie's D 3 Clamp and Guide, \$ d 2
\$30.....40¢10¢
Reading.....30¢75¢
Wentworth's Rubber Jaw, Nos. 1, 2
and 3.....30¢75¢

Miscellaneous—
Bignall & Keefer Combination Pipe
Vise.....60¢
Parker's Combination Pipe:
#7 Series.....60¢
187 Series.....60¢5¢
No. 870.....40¢

Wads—Price Per M.

B. E. 11 up.....60¢
B. E. 9 and 10.....70¢
B. E. 8.....80¢
B. E. 7.....80¢
P. E. 11 up.....\$1.00
P. E. 9 and 10.....1.25
P. E. 8.....1.50
P. E. 7.....1.50
Ely's B. E. 11 and larger.....\$1.70@1.75
Ely's P. E. 12 to 20.....\$5.00@5.25

Wagon Jacks—
See Jacks, Wagon.

Ware, Hollow—

Aluminum—
S. S. & Co. Reduced List.....40¢

Cast Iron, Hollow—

Stove Hollow Ware:
Ground.....60¢60¢75¢
Unground.....65¢65¢10¢
Waste Enamelled Ware:
Mashin Kettles.....75¢10¢75¢10¢5¢
Boilers and Saucepans.....55¢55¢5¢
Tinned Boilers and Saucepans.....55¢55¢5¢
See also Pots, Glue.

Enamelled—
Agate Nick 1 Steel Ware, list July '99, 35¢
Granite Ware, list Jan. 1, '94, revised
Jan. 2, '95.....40¢10¢
Second Quality, Agate Nickel Steel.....65¢
Second Quality, granite.....70¢10¢70¢10¢10¢

Leon Chai:
Repaired Ware, high list.....70¢
Repaired Ware, special list.....38¢45¢
Mottie Ware, high list.....75¢
Never Break Enamelled.....50¢55¢50¢10¢

Tea Kettles—

Galvanized Tea Kettles:
Inch.....6 7 8 9
Each.....50¢ 55¢ 60¢ 70¢

Steel Hollow Ware.

Avery Spiders & Griddles.....65¢65¢5¢
Avery Kettles.....60¢
Porcelain.....30¢50¢50¢10¢
Never Break Spiders and Griddles.....65¢65¢5¢

Never Break Kettles.....60¢60¢10¢
Solid Steel Spiders & Griddles.....65¢5¢
Solid Steel Ware, Enamelled.....50¢5¢

Silver Plated Hollow—

William Rogers Mfg. Co.....40¢10¢

Washboards—

Solid Zinc.....\$ doz.
Crescent, family size, bent frame, \$3.00
Red Star, laundry size, stationary
protector.....\$4.25

Double Zinc Surface:
Saginaw Globe, family size, station-
ary protector.....\$2.65
Wilson, family size, bent frame.....\$2.75

Single Zinc Surface:
Nalad protector, family size, open
back perforated.....\$2.40
Saginaw Globe, protector, family
size, ventilated back.....\$2.25
Wilson, bent frame, family size,
ventilated back.....\$2.25

Washers—**Leather, Axle—**

Solid.....80¢10¢10¢85¢
 Patent.....85¢85¢55¢
 Coil: 1½ 1¼ 1¼ 1¼
 12c 13c 14c 16c per 100

Iron or Steel

Size bolt ... 5-16 ¾ ½ ¾ ¾ ¾
 Washers.....\$5.80 1.50 3.60 5.40 3.20
 In lots less than one keg add ¼c per
 lb., 5-lb. boxes add ½c to list.

Cast Washers

Over ¾ inch, barrel lots.....per lb., 2c

Washer Cutters—

See Cutters, Washer.

Washing Machines—

See Machines, Washing.

Water Coolers—

See Coolers, Water.

Weaners—

Tyler's New Hatter—No. 1 & 2, \$3.45;
 No. 3, \$3.70; No. 4, \$4.00; No. 5, \$4.30;
 Tyler's Safety—Nos. 1 and 2, \$4.00; No. 3, \$4.30; No. 4, \$4.60.

Wedges—

Oil Finish.....lb. ¼¢
 Aze Finish.....lb. ¼¢

Weights, Sash—

Eastern prices.....\$35.00
 Western prices.....\$30.00

NOTE.—There is a wide difference in prices East and West, and some Foundries are naming lower prices than the above

Well Buckets, Galvanized

See Pails, Galvanized.

Wheels Well—

8-in. \$1.75 to \$2.00; 10-in. \$2.25 to \$2.50;
 12-in. \$2.75 to \$3.25; 14-in. \$3.00 to \$3.50

Wire and Wire Goods—

Brt. and Ann., 6 to 9.....70¢10¢
 Brt. and Ann., 10 to 13.....72¢10¢
 Brt. and Ann., 14 to 16.....75¢10¢
 Brt. and Ann., 17 to 19.....75¢10¢
 Cop'd and Galv., 6 to 9.....60¢10¢
 Cop'd and Galv., 10 to 13.....70¢10¢
 Cop'd and Galv., 14 to 16.....70¢10¢
 Cop'd and Galv., 17 to 19.....70¢10¢
 Tinned, 6 to 9.....70¢10¢
 Tinned, 10 to 13.....70¢10¢
 Tinned, 14 to 16.....70¢10¢
 Tinned, 17 to 19.....70¢10¢
 Annealed Wire on Spools.....70¢10¢
 Brass, list Feb. 26, '99.....30¢
 Copper, list Feb. 26, '99.....15¢

Cast Steel Wire.....50¢
 Stubs' Steel Wire.....\$6.00 to \$2, 60¢
 Wire Clothes Line, see Lines.
 Wire Picture Cord, see Cord.

Bright Wire Goods—

Iron and Brass, list July 1, 1899.....
 80¢10¢10¢10¢10¢

Wire Cloth and Netting—

Galvanized Wire Netting.....75¢10¢75¢10¢75¢
 Painted Screen Cloth per 100 ft.....\$1.50

Hardware Grade, 2 to 13 mesh.....

sq. ft. 2½¢3c
 Hardware Grade, 20 x 20 mesh.....sq. ft. 3¢3½c
 Galv Hardware Grade, 2 to 5 mesh.....sq. ft. 3½¢3¾c
 Galv Hardware Grade, 6 to 8 mesh.....sq. ft. 4¢4½c

Wire Barb—See Trade Repor**Wire, Rop—See Rope, Wire.****Wrenches—**

Agricultural.....70¢10¢70¢10¢5¢
 Baxter's S.....60¢10¢
 Coe's Genuine.....25¢10¢5¢5¢3¢
 Coe's "Mechanics".....25¢10¢5¢5¢3¢
 Acne.....60¢10¢
 Allen's Pocket (Bright).....\$2.00 to \$3.00
 Alligator.....60¢10¢10¢

Bemis & Call's:

Adjustable S.....35¢5¢
 Adjustable Pipe.....40¢
 Briggs' Pattern.....30¢10¢
 Combination Black.....40¢5¢
 Combination Bright.....40¢5¢
 Cylinder or Gas Pipe.....55¢
 Extra Heavy.....45¢
 Merrick's Pattern.....50¢
 No. 3 Pipe, Bright.....55¢
 Rindley Automatic.....30¢
 Roariman's.....33¢
 Bull Dog, W. & B.....60¢10¢10¢
 Donohue's Engineer.....40¢10¢
 Eagle.....50¢10¢
 Hercules.....70¢
 Solid Handles, P. S. & W.....40¢10¢
 Stevenson.....60¢10¢10¢
 Stillson's.....55¢

Wrought Goods—

Staples, Hooks, &c., list March 17, '99.....85¢85¢5¢

Yokes, Neck—

Covert Saddlery Works Trimmer 1.60 & 5¢
 Covert Saddlery Works, Neck Yoke Centers.....70¢

Yokes, Ox, and Ox Bows—

Fort Madison's Farmers & Freighters'.. list net

Zinc—

Sheet.....lb. 7c to 7¼c

PAINTS, OILS AND COLORS.—Wholesale Prices.**White Lead, Zinc, &c.**

Lead, Foreign white, in Oil.....7¼¢ 9¢
 Lead, American White, in Oil:
 Lots of 500 lb or over.....6¢
 Lots less than 500 lb.....7¢
 Lead, White, in oil, 25 lb tin
 pails, add to keg price.....¼¢
 Lead, White, in oil, 12½ lb tin
 pails, add to keg price.....¼¢
 Lead, White, in oil, 1 to 5 lb as
 sorted tins, add to keg price.....¼¢
 Lead White, Dry in bbls.....5¼¢
 Lead, American, Terms: On lots of 500
 lbs. and over, 60 days, or 2¢ for cash if
 paid in 15 days from date of invoice.
 Zinc, American, dry.....¼¢ 4¼¢ 5¼¢
 Zinc, Paris, Red Seal.....8¢
 Zinc, Paris, Green Seal.....9¢
 Zinc, Antwerp Red Seal.....7¢
 Zinc, Antwerp, Green Seal.....9¢
 Zinc, V. M. in Poppy Oil, 3 Seal
 lots of 1 ton and over.....11¼¢
 lots less than 1 ton.....12¼¢
 Zinc, V. M. in Poppy Oil, Red Seal,
 lots of 1 ton and over.....10¼¢
 lots less than 1 ton.....11¼¢
 Discounts.—V. M. French Zinc.—Dis-
 counts to buyers of 10 bbl. lots of one or
 assorted grades, 15; 25 bbls., 25; 50 bbls.,
 45. No discount allowed on less than 10
 bbl. lots.

Dry Colors.

Black, Carbon.....7¢ 20¢
 Black, Drop, Amer.....2¼¢ 4¢
 Black, Drop, Eng.....7¢ 11¢
 Black, Ivory.....15¢ 21¢
 Lamp, Com.....3¢ 5¢
 Blue, Celestial.....7¢ 5¼¢ 8¢
 Blue, Chinese.....35¢ 40¢
 Blue, Prussian.....30¢ 38¢
 Blue, Ultramarine.....3¢ 35¢
 Brown, Spanish.....14¢ 2¼¢
 Brown, Vandyke, Amer.....14¢ 2¼¢
 Brown, Vandyke, Foreign.....2¼¢ 3¢
 Carmine, No. 40.....2¼¢ 3¢
 Green, Chrome, ordinary.....5¢ 6¢
 Green, Chrome, pure.....18¢ 29¢

Lead, Red, bbls. ½ bbls. and kegs:

Lots 500 lb or over.....6¢
 Lots less than 500 lb.....7¢
 Litharge, bbls. ½ bbls. and kegs:
 Lots 500 lb or over.....6¢
 Lots less than 500 lb.....7¢
 Ocher, French Washed.....4¼¢ 5¢
 Ocher, Dutch Washed.....4¼¢ 5¢
 Ocher, American.....10¢ 15¢
 Orange Mineral, English.....9¢ 11¢
 Orange Mineral, French.....11¢ 12¢
 Orange Mineral, German.....9¢ 11¢
 Red, Indian, English.....4¢ 6¢
 Red, Indian, American.....3¢ 5¢
 Red, Turkey, En H.....4¢ 6¢
 Red, Tuscan, English.....7¢ 10¢
 Red, Venetian, Amer.....100 lb 10¢
 Red, Venetian, English.....1, 30¢ 2, 10¢
 Sienna, Italian, Burnt and
 Powdered.....3¢ 4¢ 9¢
 Sienna, Ital., Raw, Powd.....3¢ 4¢ 7¢
 Sienna, American, Raw.....1¢ 2¢
 Sienna, American, Burnt and
 Powdered.....1¼¢ 2¢
 Taic, French.....100 lb \$1.25 60¢
 Taic, American.....80¢ 1.10
 Terra Alba, French.....95¢ 1.00
 Terra Alba, English.....95¢ 1.00
 Terra Alba, American No. 1.....45¢ 50¢
 Terra Alba, American No. 2.....45¢ 50¢
 Umber, Turkey, Bnt. & Powd.....2¼¢ 3¼¢
 Umber, Bnt. Amer.....1¼¢ 2¢
 Umber, Raw, Amer.....1¼¢ 2¢
 Yellow, Chrome.....10¢ 25¢
 Vermilion, American Lead.....10¢ 25¢
 Vermilion, Quicksilver, bulk.....72¢
 Vermilion, Quicksilver, bags.....73¢
 Vermilion, English, Import.....81¢
 Vermilion, Chinese.....88¢ 95¢

Colors in Oil.

Black Lampblack.....10¢ 14¢
 Blue, Chinese.....35¢ 40¢
 Blue, Prussian.....30¢ 38¢
 Blue, Ultramarine.....3¢ 35¢

Brown, Vandyke.....9¼¢ 13¢
 Green, Chrome.....8¢ 12¢
 Green, Paris.....24¢
 Sienna, Raw.....10¢ 13¢
 Sienna, Burnt.....10¢ 13¢
 Umber, Raw.....9¼¢ 12¢
 Umber, Burnt.....9¼¢ 12¢

Miscellaneous.

Barytes, Foreign, ½ ton.....\$19.00 to \$21.00
 Barytes, Amer. doated.....19.00 to 20.00
 Barytes, Crude.....10.00 to 10.00
 Chalk, in bulk.....100 lb 2.15 2.25
 Chalk, in bbls.....100 lb 3.50
 China Clay, English.....100 lb 12.00 to 17.50
 Cobalt, Oxide.....100 lb 2.25 2.50
 Whiting, Common.....100 lb .42 ½ .52
 Whiting, Gliders......54 ½ .64
 Whiting, extra Gliders......58 ½ .68

Putty.

In bulk.....\$1.90
 In bladders.....2.40
 In cans, 1 lb to 25 lb.....3.50
 In cans, 1 lb to 5 lb.....3.60

Spirits Turpentine.

In Southern bbls.....51¢
 In machine bbls.....51½¢

Glue.

Low Grade.....13¢ 15¢
 Cabinet.....13¢ 16¢
 Medium White.....14¢ 16¢
 Extra White.....16¢ 25¢
 French.....12¢ 25¢
 Irish.....13¢ 15¢

Animal, Fish and Vegeta-**table Oils.**

Linseed, City, raw.....gal. 65¢ 68¢

Mineral Oils.

Black, 20 gravity, 25 to 30 cold
 test.....gal. 10¼¢ 11¢
 Black, 20 gravity, 15 cold test, 11¼¢ 12¢
 Black, su nmer.....10¢ 10¼¢
 Cylinder, light filtered.....15¢ 18¢
 Cylinder, dark filtered.....12½¢ 17½¢
 Paraffine, 90-907 gravity.....15¢ 18¢
 Paraffine, 90-907 gravity.....15¢ 18¢
 Paraffine, 88-1 gravity.....13½¢ 13¢
 Paraffine, red, No. 1.....15¢ 15½¢
 In small lots ½¢ advance.

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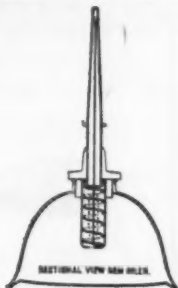
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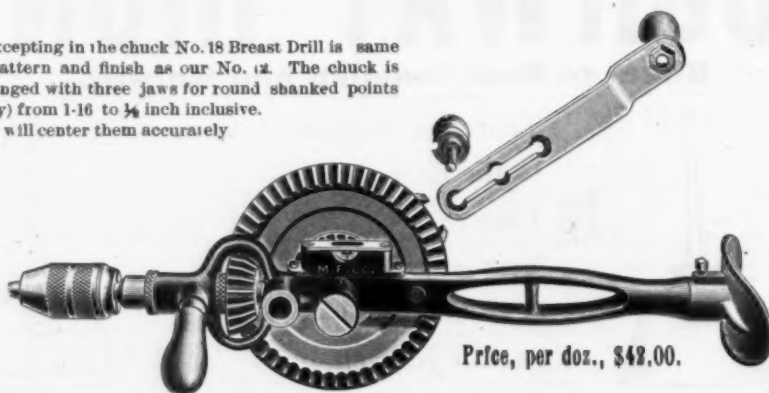
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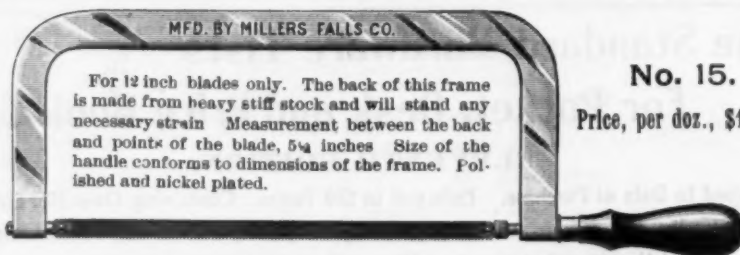
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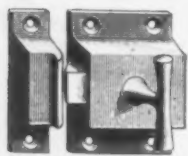
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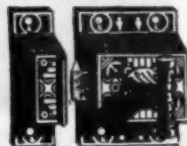
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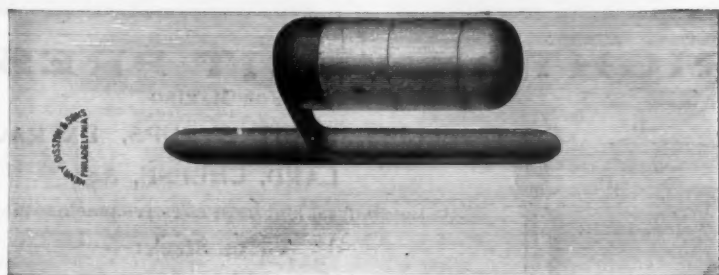
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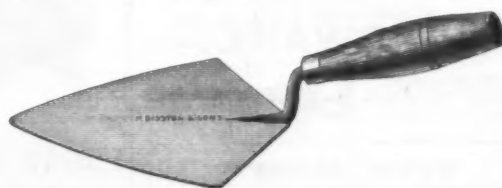
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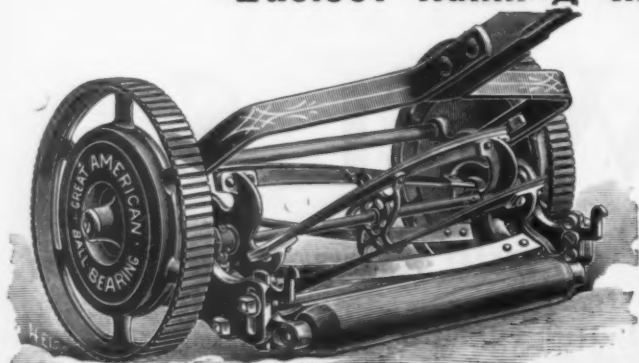
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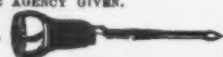
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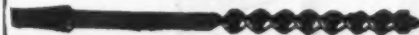
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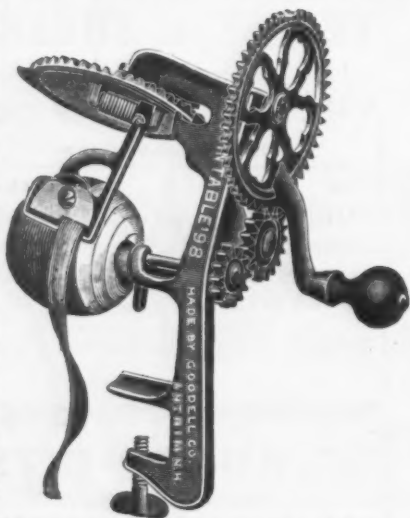
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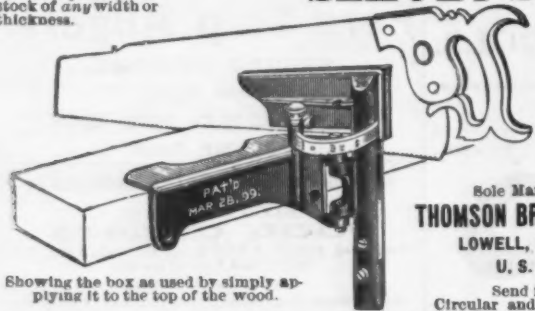
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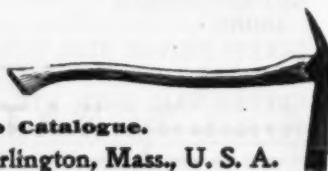
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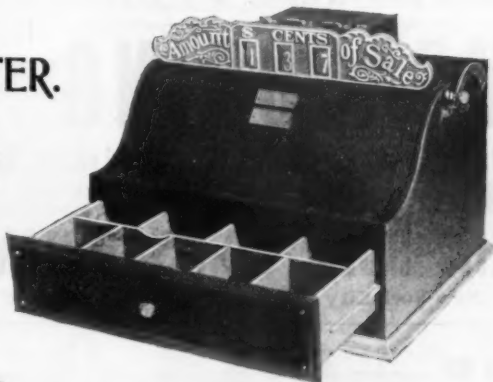
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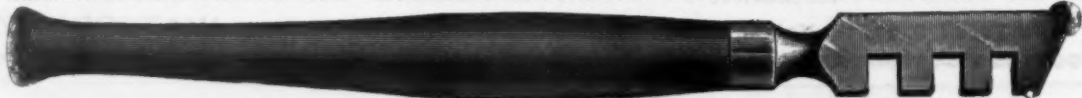
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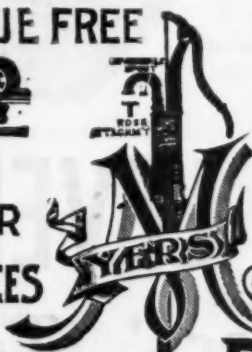


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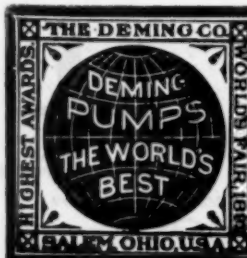
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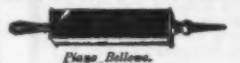
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On account of the character of its subject matter this book will perhaps be specially interesting to traveling salesmen, but the employer cannot fail to find in it many suggestions in regard to the success of salesmen on the road and the treatment which should be accorded to them. In a similar way the narration of personal experiences and the discussion of the different subjects covered by the volume will be of interest to merchants, by whom many hints in regard to business matters may be gathered.

The book treats the traveling man, as a class, on a broad basis, bringing out his condition, character and conduct, with incidents based on actual experiences, and description of the methods pursued with buyers of the various types with whom he has to do. It is thus not only a readable book, but contains also much that is suggestive to those who are looking for the secret of success on the road. Some idea of the scope of the book and the many topics treated may be obtained from the heading of the 33 chapters into which the book is divided:

His Position in the Trade.
A Companionable Fellow.
When He Passes.
The Syndicate Salesmen.
The Pace that Kills.
Temptations.
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Salesman and Buyer.
Friction.
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The Salesman and the Office Man.
Wide Awake.
Off the Road.
Treating of Various Things.
The Jobber's Salesman.
The Field of the Jobber's Salesman.

The Retail Trade.
The Jobber's Salesman's Relations to
His House.
The Salesman in a Rut.
Money Matters.
Loyalty.
The Buyer Out
Other Hindrances.
Samples and Their Value.
Judgment and Discretion.
Kindness, Courtesy, Conclusion.

An Appendix gives some letters from merchants and travelers in which some phrases of the general subject are discussed. Among these are:

The Oldest Hardware Traveler.
The Value of a Buyer's Time.
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From an Old Hardware Traveler.
What the Trade Say About Traveling
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Leather	100	4 x 8 with Column Headings	\$0.15	
	101	4 x 16 with Column Headings	.25	
	102	4 x 13 with Column Headings	.30	
	103	3 x 7 with Column Headings	.10	
	104	7 x 4 with Column Headings	.5	
	105	11 x 8 without Headings	.25	
	106	8 x 12 with Column Headings	.30	
	107	5 x 4 with Column Headings	.10	
	108	10 x 12 without Headings	.35	

This cut shows, in reduced size, one of the uses for which Price Card No. 100 may be employed. The word Belting is cut from the Price Card Pastors.

No.	Size, inches.	Price each.
100	4 x 8 with Column Headings	\$0.15
101	4 x 16 with Column Headings	.25
102	4 x 13 with Column Headings	.30
103	3 x 7 with Column Headings	.10
104	7 x 4 with Column Headings	.5
105	11 x 8 without Headings	.25
106	8 x 12 with Column Headings	.30
107	5 x 4 with Column Headings	.10
108	10 x 12 without Headings	.35

All these Price Cards are furnished with blank space at top for name of article, for which The Iron Age Hardware Price Card Pastors are provided.

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Black	12	14 x 12 x 13	.24	
1000	14	15 x 13 x 14	.26	
Pigs	16	16 x 14 x 15	.27	
	17	17 x 15 x 16	.29	
List	18	19 x 17 x 18	.33	
May 10	20	21 x 19 x 20	.37	
1899	22	23 x 21 x 22	.43	
	24	25 x 23 x 24	.45	
	26	27 x 25 x 26	.47	
Cost	28	29 x 27 x 28	.49	
2 x 1/2	30	31 x 29 x 30	.51	
3 x 1/2	32	33 x 31 x 32	.53	
4 x 1/2	34	35 x 33 x 34	.55	
5 x 1/2	36	37 x 35 x 36	.57	
6 x 1/2	38	39 x 37 x 38	.59	
7 x 1/2	40	41 x 39 x 40	.61	
8 x 1/2	42	43 x 41 x 42	.63	
9 x 1/2	44	45 x 43 x 44	.65	
10 x 1/2	46	47 x 45 x 46	.67	
11 x 1/2	48	49 x 47 x 48	.69	
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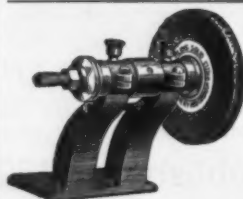
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N^o3

MOSTEST
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MONEY.

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WIDE BOWLS
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N^o300

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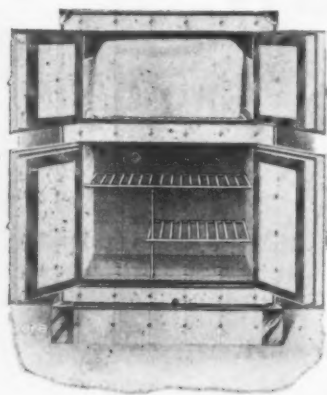
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2 Doz. Box, No. 3.		PRICES TO DEALERS PER DOZ.	{ \$0.85 1.00 1.50 1.50 2.00	RETAIL PRICE.	{ \$0.10 .15 .20 .20 .25	To introduce quick. If your jobber declines order, order direct Goods warranted satisfactory. No risk. Sales increasing.		
1 " " " 4.								
1 " " " 40.								
1 " " " 300.								
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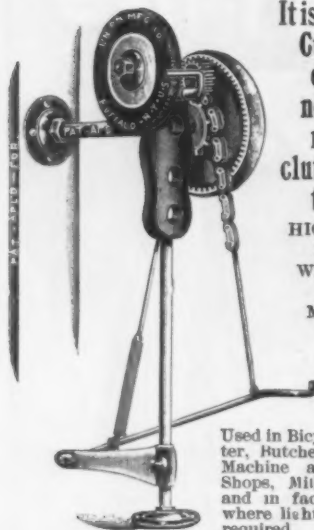
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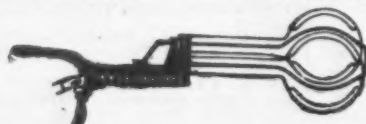
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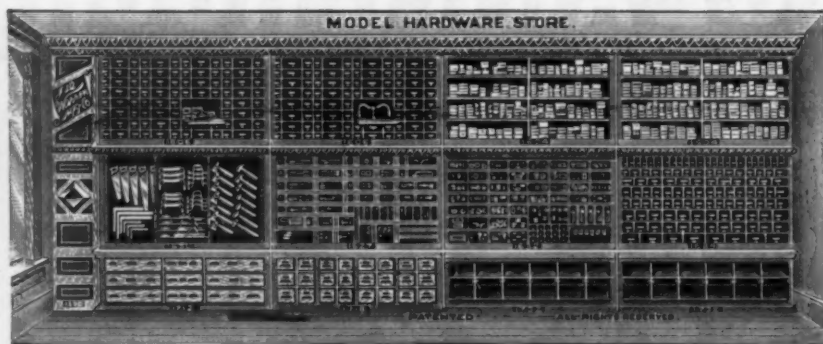
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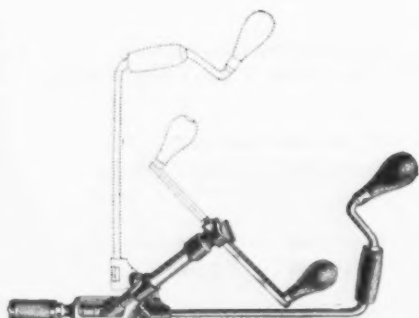
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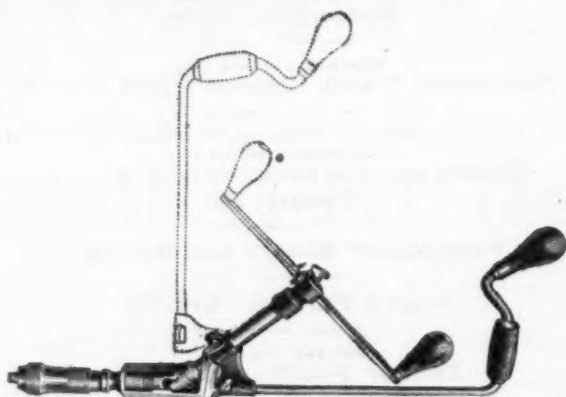
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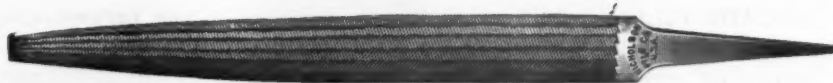
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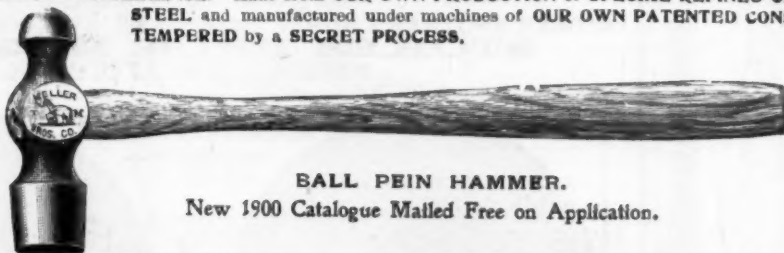
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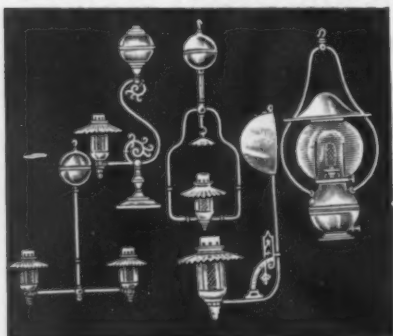
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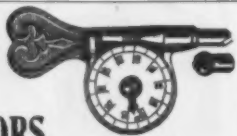
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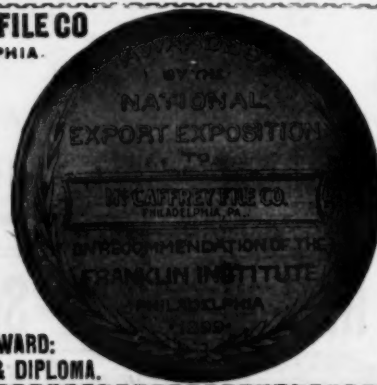


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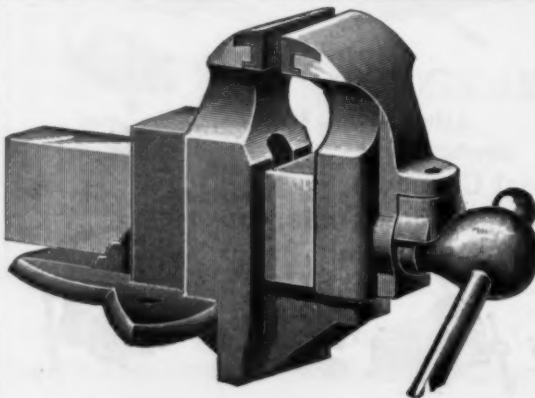
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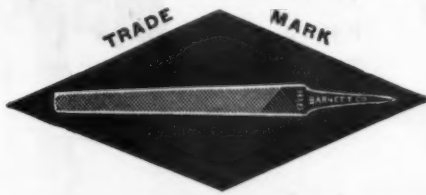
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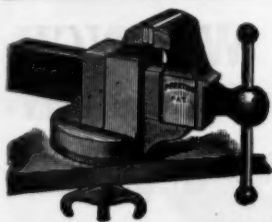


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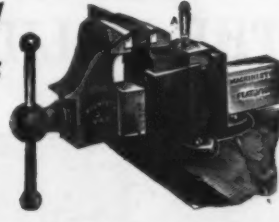
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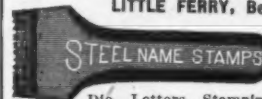
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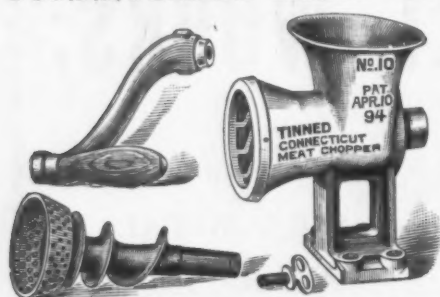
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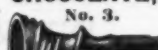


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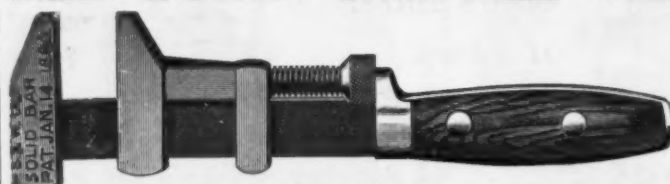
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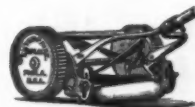
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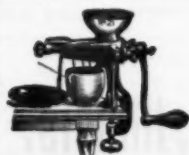
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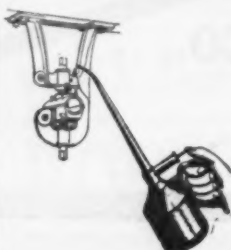
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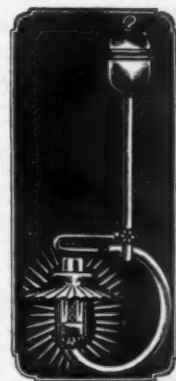
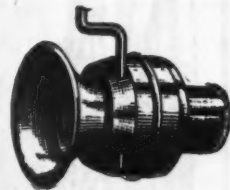


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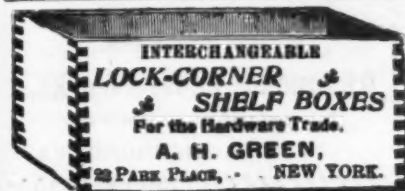
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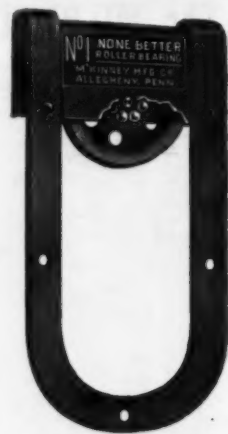
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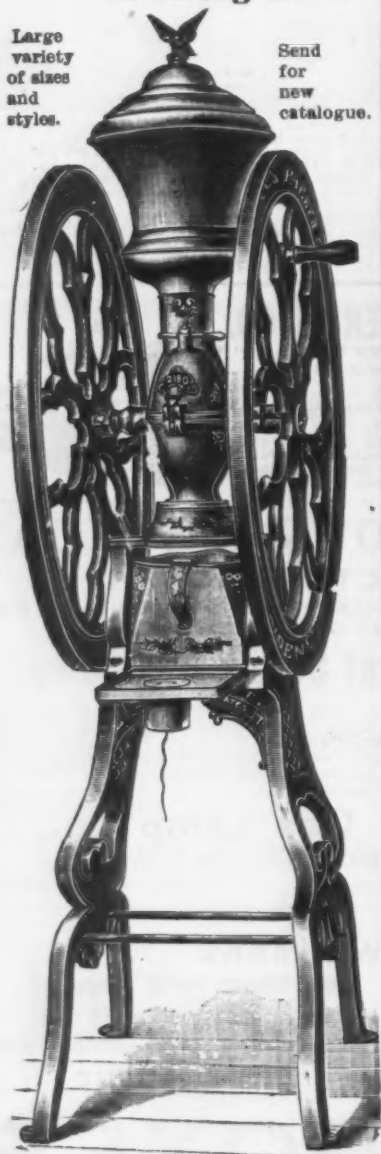


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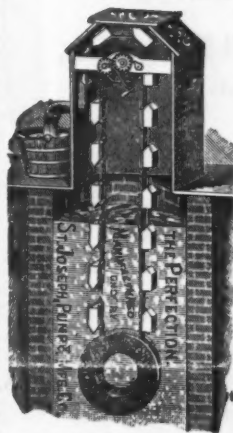
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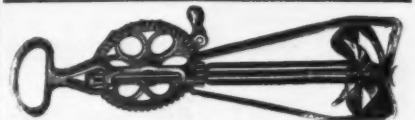


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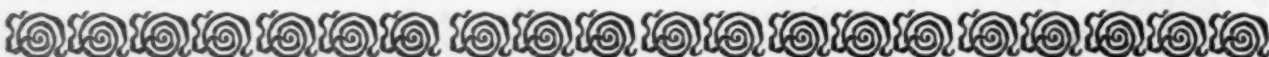
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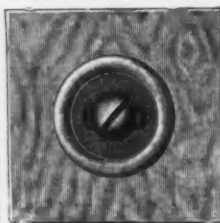


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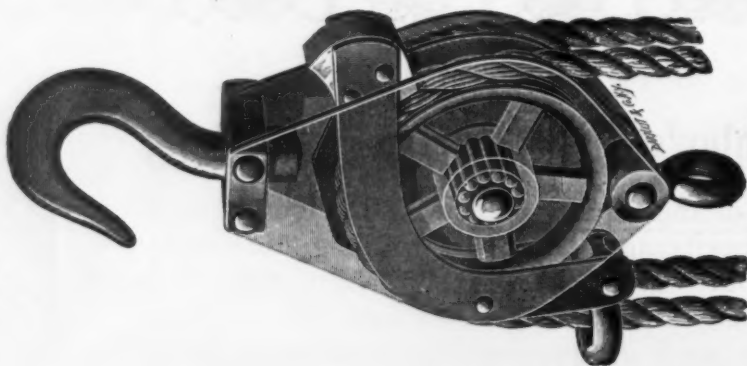
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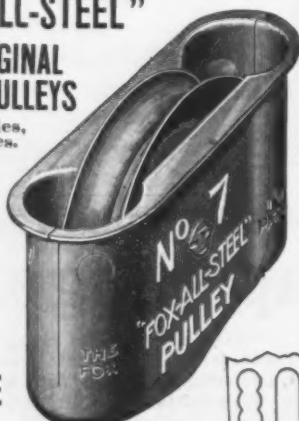
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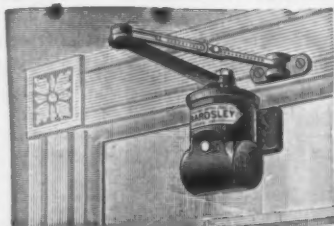
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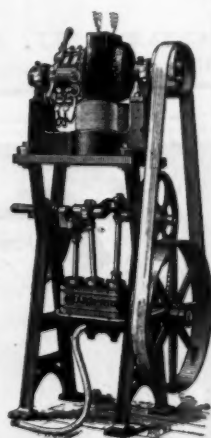
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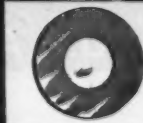
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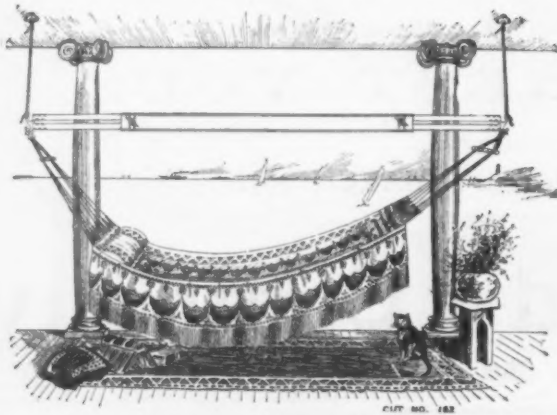
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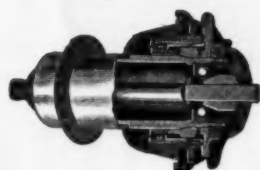
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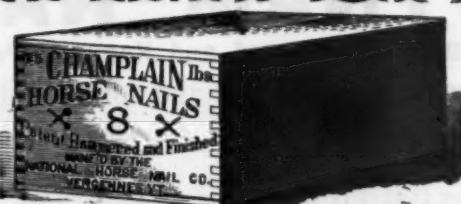
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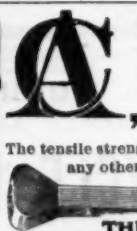
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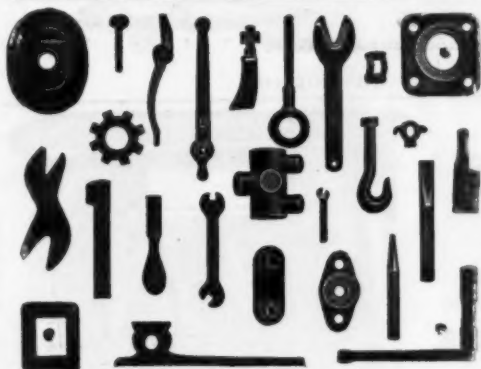


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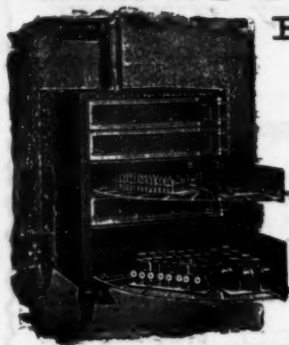
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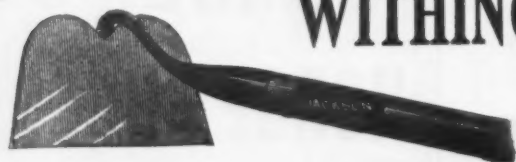
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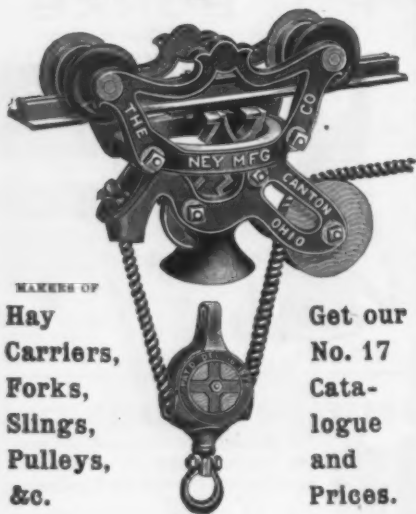
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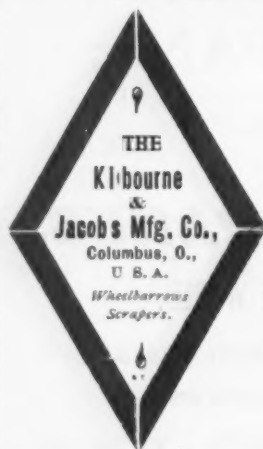
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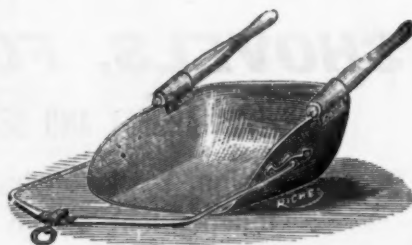
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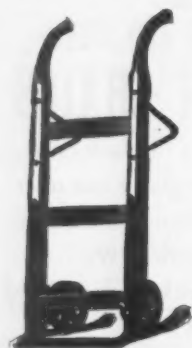
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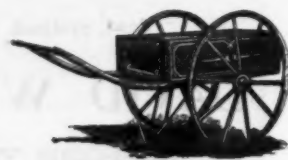
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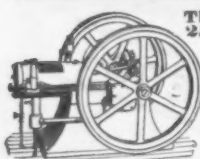
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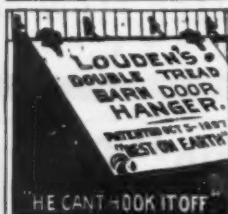
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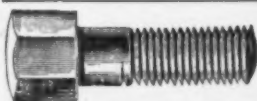


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American Hdw. Mfg. Co., Ottawa, Ill.
Bliss, E. W. Co., Brooklyn, N. Y.
Ferracute Mach. Co., Bridgeton, N. J.
Hay-Budden Mfg. Co., Brooklyn, N. Y.
Mossberg, Frank Co., Attleboro, Mass.
Richard Mfg. Co., Bloomsburg, Pa.
Wilson & Smith, Worcester, Mass.

Door Bells.—See Bells and Gongs.

Door Checks and Springs

Bardsley, Jos., 147 1st Baxter St., N. Y.
Fullman Sash Balance Co., Rochester, N. Y.

Toler, John, Sons & Co., Newark, N. J.

Door Holders

Brohard Co., Phila., Pa.

Caldwell Mfg. Co., Rochester, N. Y.

Draught Springs

Burditt & Williams, Boston, Mass.

Draw Benches

Richard Mfg. Co., Bloomsburg, Pa.

Thompson, Hugh L., Waterbury, Ct.

Drill Grinders

Heald, L. S. & Son, Barre, Mass.
Sellers, Wm. & Co., Inc., Phila., Pa.
Washburn Shops of Worcester Polytechnic Inst., Worcester, Mass.

Wilmshurst & Morman, Kalamazoo, Mich.

Drilling Machines

Baker Bros., Toledo, O.
Barnes, R. F. Co., Rockford, Ill.
Barnes, W. F. & John Co., Rockford, Ill.
Baush & Harris Mch. Tool Co., Springfield, Mass.

Bickford Drill & Tool Co., Ctn., Ohio.

Bullard Machine Tool Co., Bridgeport, Ct.

Burnham, Geo. Co., Worcester, Mass.

Champion Blower & Forge Co., Lancaster, Pa.

Cincinnati Mch. Tool Co., Cincinnati, O.

Dallett, Thos. H. & Co., Philadelphia, Pa.

D'Amour & Littledale Mch. Co., 181 Worth St., N. Y.

Davis, W. F., Machine Co., Rochester, N. Y.

Detrick & Harvey Mch. Co., Baltimore, Md.

Harrington, E. Son & Co., Phila., Pa.

Hill, Clarke & Co., Boston, Mass.

Hoefer Mfg. Co., Freeport, Ill.

Frederick Bros., Worcester, Mass.

Quint, A. D., Hartford, Conn.

Shuster, F. B. Co., New Haven, Conn.

Stibley & Ware, So. Bend, Ind.

Sigourney Tool Co., Hartford, Conn.

Silver Mfg. Co., Salem, O.

Slate Dwight Machine Co., Hartford, Ct.

Stow Flexible Shaft Co., Phila., Pa.

Wiley & Russell Mfg. Co., Greenfield, Mass.

York, S. M. Co., Cleveland, O.

Drilling Machines, Automatic

Gould & Eberhardt, Newark, N. J.

Drills, Pneumatic

Chicago Pneumatic Tool Co., Chicago, Ill.

Drop Forgings

Belden Machine Co., New Haven, Conn.
Billings & Spencer Co., Hartford, Conn.
Chicago Drop Forging & Fdry. Co., Kensington, Ill.

Clapp, E. D. Mfg. Co., Auburn, N. Y.
Consolidated Railway Electric Light- ing & Equipment Co., 60 Broadway, N. Y.

Eccles, Richard, Auburn, N. Y.

Indianapolis Drop Forging Co., Indian- apolis, Ind.

Keystone Drop Forge Co., Philadelphia.

Kilborn & Bishop Co., New Haven, Conn.

R. I. Tool Co., Providence, R. I.

Seranton Forging Co., Seranton, Pa.

Seward, M. & Son Co., New Haven, Ct.

Springfield Drop Forging Co., Spring- field, Mass.

Strieby & Foote Co., Newark, N. J.

Transue & Williams Co., Alliance, O.

Williams, J. H. & Co., Brooklyn, N. Y.

Wyman & Gordon, Worcester, Mass.

Drop Hammers

Billings & Spencer Co., Hartford, Conn.

Williams, White & Co., Moline, Ill.

Drop Presses

Manville, E. J. Mch., Co., Waterbury, Ct.
Miner & Peck Mfg. Co., New Haven, Ct.
Mossberg & Granville Mfg. Co., Provi- dence, R. I.

Vulcan Iron Works, Chicago, Ill.

Dumb Waiters

Energy Mfg. Co., Philadelphia, Pa.

Spedel, J. G., Reading, Pa.

Storm Mfg. Co., Newark, N. J.

Variety Machine Co., Warsaw, N. Y.

Dump Cars

Atlas Bolt & Screw Co., Cleveland, O.

Dynamos

Eddy Electric Mfg. Co., Windsor, Conn.

General Electric Co., Schenectady, N. Y.

Eave Trough Hangers

Berger Bros. Co., Philadelphia, Pa.

Oatman Bros., Medina, O.

Edge Tools

Buck, Chas., Millbury, Mass.
Buck Bros., Millbury, Mass.
Ferro-Carbon Castings Co., Phila. Pa.
White, L. & I. J. Co., Buffalo, N. Y.

Egg Beaters

Lyon, Nelson, Albany, N. Y.
Standard Co., Boston, Mass.
Taplin Mfg. Co., Forestville, Conn.

Egg Opener

Hartigan, W. R., Collinsville, Ct.

Electric Bells and Supplies

Ostrander, W. R. & Co., 204 Fulton St.

Electric Controllers

Electric Controller & Supply Co., Cleve- land, O.

Electric Lighting and Power Ap- paratus

Eddy Electric Mfg. Co., Windsor, Conn.

General Electric Co., Schenectady, N. Y.

Electrical Supplies

Mianus Electric Co., Mianus, Conn.

Electrotypes

St. Louis Electrotpe Foundry, St. Louis, Mo.

Elevators. Makers of

Eastern Machinery Co., New Haven, Ct.
Link-Belt Engineering Co., Phila., Pa.
Emery Mfg. Co., Phila., Pa.

Morse, Williams & Co., Phila., Pa.

Ridgway, Craig & Son Co., Coatesville, Pa.

Spedel, J. G., Reading, Pa.

Variety Machine Co., Warsaw, N. Y.

Elevator Buckets

Clark, W. J. & Co., Salem, O.

Cleveland Elevator Bucket Co., Cleve- land, O.

Elevator Enclosures and Cabs

Ludlow Saylor Wire Co., St. Louis, Mo.

Emery

Tanite Co., Stroudsburg, Pa.

Emery Wheels

American Emery Wheel Works, Provi- dence, R. I.
Best, L. & Vesey St., N. Y.

Bridgeport Safety Emery Wheel Co., Bridgeport, Conn.

Buffalo Emery Wheel Co., Buffalo, N. Y.

Chicago Emery Machine Co., Phila., Pa.

Diamond Mach. Co., Providence, R. I.

Nazel & Bassett, Phila., Pa.

Northampton Emery Wheel Co., Leeds, Mass.

Norton Emery Wheel Co., Worcester, Mass.

Safety Emery

Foot Power Emery Wheels

Buffalo Emery Wheel Co., Buffalo, N. Y.

Foot Pumps

Gleason-Peters Air Pump Co., Houston and Mercer Sts., N. Y.

Foot Rests

Star Heel Plate Co., Newark, N. J.

Forges, Portable, &c.

Bradley Co., Syracuse, N. Y.

Champion Blower & Forge Co., Lancaster, Pa.

Fairbanks Co., 311 Broadway, N. Y.

Sturtevant, B. F. Co., Boston, Mass.

Forgings, Iron and Steel

Baker, Jas. H. Mfg. Co., Pittsburgh, Pa.

Bethlehem Steel Co., S. Bethlehem, Pa.

Eastern Forge Co., Boston, Mass.

Frankford Steel Co., Phila., Pa.

Hay-Budden Mfg. Co., Brooklyn, N. Y.

Otis Steel Co., Ltd., Cleveland, Ohio.

Pittsburgh Shear, Knife & Machine Co., Pittsburgh, Pa.

Titusville Forge Co., Titusville, Pa.

Vulcanus Forging Co., Cleveland, O.

Forks, Hay and Manure

Continental Tool Co., Frankfort, N. Y.

Iowa Farming Tool Co., Ft. Madison, Ia.

Whittington & Cooley Mfg. Co., Jackson, Mich.

Foundry Facings

Obermayer, S. Co., Cincinnati, O.

Foundry Lamps

Forest City Foundry & Mfg. Co., Cleveland, Ohio.

Paxson, J. W. Co., Phila., Pa.

Foundry Supplies

Gilmour, J., Bennett Building, N. Y.

Obermayer, S. Co., Cincinnati, Ohio.

Osborn Mfg. Co., Cleveland, O.

Paxson, J. W. Co., Phila., Pa.

Four-Head Milling Machines

Ingersoll Milling Machine Co., Rockford, Ill.

Friction Clutches

Eastern Machinery Co., New Haven, Ct.

Friction Shapers

Perkins Machine Co., Boston, Mass.

Furnaces, Foundry

Byram & Co., Detroit, Mich.

Furnaces, Oil, Gas and Coal

Rockwell Engineering Co., 25 Cortlandt St., N. Y.

Fuses

Ensign Bickford & Co., Simsbury, Ct.

Gages

Crosby Steam Gage & Valve Co., Boston.

Galvanized Ware

Keen & Hagerty Mfg. Co., Baltimore.

Galvanizing

Blackman & King, 801 Greenwich St., N. Y.

Empire Pipe Bending & Supply Co., Brooklyn, N. Y.

Galvanizing Process

U. S. Electro Galvanizing Co., 348 Broadway, N. Y.

Garden Rakes

Jenkins Iron & Tool Co., Howard, Pa.

Garden Tools

Whittington & Cooley Mfg. Co., Jackson, Mich.

Gas Compressor

Uehling, Steinbart & Co., Ltd., Carlstadt, N. J.

Gas Compressors

Norwalk Iron Works Co., So. Norwalk, Conn.

Gas Furnaces

Am. Gas Furnace Co., 33 John St., N. Y.

Chicago Flexible Shaft Co., Chicago, Ill.

Gaskets

Canfield, H. O., Bridgeport, Conn.

Gaskets, Iron

Smooth On Mfg. Co., Jersey City, N. J.

Gas Producers

Duff Patents Co., Allegheny, Pa.

Smythe, S. R. Co., Inc., Pittsburgh, Pa.

Swindell, W. & Bro., Pittsburgh, Pa.

Gauges, Rolling Mill

Haines Gauge Co., Philadelphia, Pa.

Gears

Boston Gear Works, Boston, Mass.

Crescent, Geo. V. Co., Philadelphia, Pa.

Gleason Tool Co., Rochester, N. Y.

Morse, Williams & Co., Phila., Pa.

Nuttall, R. D. Co., Allegheny, Pa.

Poole, Robt. Son & Co., Baltimore, Md.

Gears, Rawhide

Horsburgh & Scott, Cleveland, Ohio.

Nazel & Bassett, Phila., Pa.

Gear Cutters

Becker-Brainard Milling Machine Co., Hyde Park, Mass.

Gould & Eberhardt, Newark, N. J.

Whitton, D. E. Mch. Co., New London, Conn.

Glimlets

Norton Mfg. Co., Chester, Conn.

Glass Cutters

Barrett, W. L., Bristol, Conn.

Bulman, F. H. & Co., Cleveland, O.

Monroe, S. G., Unionville, Conn.

Smith & Hemenway Co., 296 Broadway, N. Y.

Glass Cutting Boards

Larkin Rule Co., Saginaw, Mich.

Glove

Bacter, Adamson & Co., Phila., Pa.

Golf Goods

Bridgeport Gun Implement Co., 812 Broadway, N. Y.

Grates, Rocking

Sennett, Geo. B. Co., Youngstown, O.

Grinding and Polishing Mchs.

American Emery Wheel Works, Providence, R. I.

Barnes, W. F. & John Co., Rockford, Ill.

Brown & Sharpe Mfg. Co., Providence, R. I.

Challenge Machine Co., Phila., Pa.

Cincinnati Milling Mach. Co., Cincinnati, O.

Diamond Mach. Co., Providence, R. I.

Laudis Tool Co., Waynesboro, Pa.

Northampton Emery Wheel Co., Leeds, Mass.

Norton Emery Wheel Co., Worcester, Mass.

Safety Emery Wheel Co., Springfield, O.

Springfield Mfg. Co., Bridgeport, Conn.

Star Corundum Wheel Co., Detroit, Mich.

Tanite Co., Stroudsburg, Pa.

Universal Mach. Co., Providence, R. I.

Wilmarth & Morman, Kalamazoo, Mich.

Grindstones

Cleveland Stone Co., Cleveland, O.

Velox Machine Works, Chicago, Ill.

Grubbing Machine

New Century Mfg. Co., 45 E. 8th St., N. Y.

Guns

Marlin Fire Arms Co., New Haven, Ct.

Remington Arms Co., 915 Broadway, New York

Gymnasium Apparatus

Narragansett Mch. Co., Providence, R. I.

Hack Saws

Disston, Henry & Sons, Inc., Phila., Pa.

Goodell-Pratt Co., Greenfield, Mass.

Springfield Machine Screw Co., Springfield, Mass.

Starrett, L. S. Co., Athol, Mass.

Hack Saw Frames

Millers Falls Co., 23 Warren St., N. Y.

Hammers

Heller Bros. Co., Newark, N. J.

Logan & Strobbridge Iron Co., New Brighton, Pa.

Hammers, Pneumatic

Chicago Pneumatic Tool Co., Chicago, Ill.

Hammocks

Palmer, I. E., Middletown, Conn.

Bicknell Hdw. Co., Janesville, Wis.

Hand Screws

Bliss, R. Mfg. Co., Pawtucket, R. I.

Handle Machinery

Defiance Machine Works, Defiance, O.

Hangers, Barn Door

Coleman Hardware Co., Chicago, Ill.

Hangers, Door

Chicago Spring Butt Co., Chicago, Ill.

Coburn Trolley Track Mfg. Co., Holyoke, Mass.

Lancaster Bros., Poughkeepsie, N. Y.

Lawrence Bros., Sterling, Ill.

Louden Machinery Co., Fairfield, Iowa.

McCabe Hanger Mfg. Co., 533-543 W. 22d St., N. Y.

McKinney Mfg. Co., Allegheny, Pa.

Ney Mfg. Co., Canton, Ohio.

Stowell Mfg. & Foundry Co., So. Milwaukee, Wis.

Wilcox Mfg. Co., Aurora, Ill.

Hangers, Shafting

Ball Bearing Co., Boston, Mass.

Dodge Mfg. Co., Milwaukee, Ind.

Machinists Supply Co., Rochester, N. Y.

Hardware Comm'n Merchants

Graham, Jno. H. & Co., 113 Chambers St., N. Y.

Huerfano, U. T., Brass & Copper Co., 121 Worth St., N. Y.

Hardware Manufacturers

Arcade Mfg. Co., Freeport, Ill.

Central Hardware Co., Phila., Pa.

Coleman Hardware Co., Chicago, Ill.

Logan & Strobbridge Iron Co., New Brighton, Pa.

Miller Falls Co., 23 Warren St., N. Y.

Ney Mfg. Co., Canton, Ohio.

Nicol & Co., Chicago, Ill.

Parker, Chas. Co., Meriden, Conn.

Peck, Stow & Wilcox Co., 27 Murray St., N. Y.

Southington Cutlery Co., Southington, Conn.

Stanley Works, New Britain, Conn.

Union Mfg. Co., 103 Chambers St., N. Y.

Van Wagoner & Williams Hdw. Co., Cleveland, O.

Wrightville Hdw. Co., Wrightsville, Pa.

Hardware Mfrs.' Agents

Camp, John H. & Co., 113 Chambers St., N. Y.

Webb & Hilger, Ltd., 9-15 Murray St., N. Y.

Hardware Shelving

Warren, J. D. Mfg. Co., Chicago, Ill.

Hardware Specialties

Acme Shear Co., Bridgeport, Conn.

Berger Bros. Co., Philadelphia, Pa.

Enterprise Mfg. Co., of Pa., Phila., Pa.

Graham, John H. & Co., 113 Chambers St., N. Y.

Pleuger & Henger Mfg. Co., St. Louis, Mo.

Scranton & Co., The, New Haven, Ct.

Smith & Egge Mfg. Co., Bridgeport, Ct.

Smith & Hemenway Co., 296 Broadway, N. Y.

Wilson & Smith, Worcester, Mass.

Harness Snaps

Covert Mfg. Co., West Troy, N. Y.

Covert's Saddlery Wks., Farmer, N. Y.

Imperial Bit & Snap Co., Racine, Wis.

Haps and Staples

McKinney Mfg. Co., Allegheny, Pa.

Hatchets

Jenkins Iron & Tool Co., Howard, Pa.

Hay Knives

Clark & Parsons Co., E. Wilton, Me.

Ney Mfg. Co., Canton, Ohio.

Hay Slings

Goshen Mfg. Co., Goshen, Ind.

Hay Tools

Louden Machinery Co., Fairfield, Iowa.

Myers, F. E. & Bro., Ashland, O.

Ney Mfg. Co., Canton, O.

Heating and Ventilating Apparatus

American Blower Co., Detroit, Mich.

Bayley, Wm. & Sons Co., Milwaukee, Wis.

Boston Blower Co., Hyde Park, Mass.

Buffalo Forge Co., Buffalo, N. Y.

Perrins, B. F. & Son, Holyoke, Mass.

Sturtevant, B. F. Co., Boston, Mass.

Heel Plates

Star Heel Plate Co., Newark, N. J.

Hinges

Jenkins Iron & Tool Co., Howard, Pa.

Lawrence Bros., Sterling, Ill.

McKinney Mfg. Co., Allegheny, Pa.

Stanley Works, New Britain, Conn.

Tiebart, W. & J., 113 Chambers St., N. Y.

Hitching Posts

Hartman Mfg. Co., 309 Broadway, N. Y.

Hoes, Garden, Planters, &c.

Confederal Tool Co., Frankfort, N. Y.

Iowa Farming Tool Co., Fort Madison, Iowa.

Jenkins Iron & Tool Co., Howard, Pa.

Hoists, Air

Pedrick & Ayer Co., Philadelphia, Pa.

Ridgway, Craig & Son Co., Coatesville, Pa.

Hoists, Chain and Rope

Box, Alfred & Co., Philadelphia, Pa.

Chisholm & Moore Mfg. Co., Cleveland, Ohio.

Eckstein, C. G., 249 Centre St., N. Y.

Fulton Iron & Engine Works, Detroit, Mich.

Harrington, E. Son & Co., Phila., Pa.

McCoy, Jos. F. & Co., 26 Warren St., Reading, Pa.

Reading Crane & Hoist Works, Reading, Pa.

Speidel, J. G., Reading, Pa.

Hoisting Machines

Eastern Machinery Co., New Haven, Ct.

Lidgerwood Mfg. Co., 56 Liberty St., N. Y.

Hollow Mill

Geometric Drill Co., Westville, Conn.

Hollow Ware

Avery Stamping Co., Cleveland, Ohio.

Cleveland Stamping & Tool Co., Cleveland, O.

New York Stamping Co., Brooklyn, N. Y.

Rogers, Jno. M. Boat-Gauge & Drill Works, Gloucester, City, N. J.

Horse Nails

Capewell Horse Nail Co., Hartford, Ct.

Mooney, W. M. & Co., Ausable Chasm, N. Y.

National Horse Nail Co., Vergennes, Vt.

Putnam Nail Co., Neponset, Boston.

Webb & Hilger, Ltd., 9-15 Murray St., N. Y.

Horse and Mule Shoes

Burdin Iron Co., Troy, N. Y.

Phoenix Horse Shoe Co., Poughkeepsie, Rhode Island.

Rhode Island Perkins Horse Shoe Co., Providence, R. I.

Horsehoe Studs

Leonhart & Co., Berlin, Schoneberg, Germany.

Hose

Boston Belting Co., Boston, Mass.

Peerless Rubber Mfg. Co., 16 Warren Street, New York.

Hose Couplings

Clark, W. J. & Co., Salem, Ohio.

Hose Coupling, Air

Friedrich & Ayer Co., Philadelphia, Pa.

Hose Washers

Canfield, H. O., Bridgeport, Conn.

Horse Furnishing Specialties

Williams, A. C., Ravenna, O.

Hu-king Pins

Clark, R. F., Chicago.

Hydrants

Reading Fdry. Co., Reading, Pa.

Hydraulic Jacks

Dudgeon, Richard, 24 Columbia St., N. Y.

Watson-Stillman Co., 204 E. 43d St., N. Y.

Hydraulic Machinery

Watson-Stillman Co., 204 E. 43d St., N. Y.

Cornell, J. B. & J. M., 26th St. and 11th Ave., N. Y.

Hydraulic Tools

- Cornell, J. B. & J. M., 26th St. and 11th Ave., New York City.
 Davis, W. P. Machine Co., Rochester, N. Y.
 Dawson, A. L. & Co., Chicago, Ill.
 Decker & Harvey Mch. Co., Baltimore, Md.
 Diamond Drill & Mch. Co., Birdsboro Pa.
 Dean, J. B. & Co., Chicago, Ill.
 Draper Mach. Tool Co., Worcester Mass.
 Farrell & Dry & Mch. Co., Ansonia, Conn.
 Ferracute Machine Co., Bridgeton, N. J.
 Fish, H. C. Machine Works, Worcester, Mass.
 Garvin Machine Co., Spring and Varick Sts., N. Y.
 General Supply Co., 40 John St., N. Y.
 Geometric Drill Co., Westville, Conn.
 Gray, John, 52-54 E. 132d St., N. Y.
 Hannan & Finton, Springfield, Mass.
 Hendey Machine Co., Torrington, Conn.
 Hill, Henry F., Boston, Mass.
 Hill, Clarke & Co., Boston, Mass.
 Johnson, Israel H., Jr., & Co., Phila.
 Johnson, Wm. C. & Sons Mch. Co., St. Louis, Mo.
 Kaiser, A. V. & Co., Phila., Pa.
 Keagy & Lear Mch. Co., Cohasset, O.
 Kerrick, J. H., Minneapolis, Minn.
 Lodge & Shipley Mch. Tool Co., Cin., O.
 Lund, S. T., Boston, Mass.
 McCabe, J. J., 14 Dey Street, N. Y.
 McDowell Stocker & Co., Chicago.
 Manning, Maxwell & Moore, 83-89 Liberty St., N. Y.
 Manville, E. J. Mach. Co., Waterbury, Ct.
 Marshall & Huchart Mchry. Co., Chicago, Ill.
 Mossberg, Frank Co., Attleboro, Mass.
 National Machinery Co., Tiffin, Ohio.
 New Doty Mfg. Co., Janesville, Wis.
 New Haven Mfg. Co., New Haven, Conn.
 New York Machinery Depot, 178 Broadway, New York.
 Niles Tool Wks., 138 Liberty St., N. Y.
 Nilson, A. H. Mch. Co., Bridgeport, Ct.
 Norton, W. D., Cincinnati, O.
 Paradox Machinery Co., Chicago, Ill.
 Pennsylvania Machinery Co., Phila., Pa.
 Phila. Machine Tool Co., Phila., Pa.
 Pittsburgh Mfg. Co., Pittsburgh, Pa.
 Poole, Robt. & Son Co., Baltimore, Md.
 Potter & Johnston Co., Pawtucket, R. I.
 Poulter & Co., Phila., Pa.
 Pratt & Whitney Co., Hartford, Conn.
 Prentice Bros., Worcester, Mass.
 Prentiss Tool & Supply Co., 115 Liberty St., N. Y.
 Ralmer & Williams, Chicago, Ill.
 Reade, Wm. A. & Co., Cleveland, O.
 Seyfert's Sons L. F., Philadelphia, Pa.
 Sigourney Tool Co., Hartford, Conn.
 Thomas & Lowe Machinery Co., Providence, R. I.
 Toomey, Frank, Philadelphia, Pa.
 Waterbury Farrel Foundry & Mch. Co., Waterbury, Conn.
 Wetherill Robert & Co., Chester, Pa.
 Windsor Machine Co., Windsor, Vt.
 Worner, C. C. Mchry. Co., Detroit, Mich.
 York, S. M. Co., Cleveland, O.
- Machinery, Wood Working**
 Deffance Machine Wks., Deffance, O.
 Fay, J. A. & Co., Cincinnati, Ohio.
- Machinery Springs**
 Scott, Chas. Spring Co., Phila., Pa.
- Machinery Builders**
 Chapman, J. B. & Co., Springfield, Mass.
- Machine Knives**
 Loyd, John, 558-562 Water St., N. Y.
- Machine Screws—See Screws, Machine**
- Machine Screw Work**
 Spencer Automatic Mch. Screw Co., Hartford, Conn.
- Machine Tools—See Machinery**
- Machine Work**
 Nuttall, R. D. Co., Allegheny, Pa.
- Machine Wrenches**
 Billings & Spencer Co., Hartford, Conn.
- Machinists' Scales**
 Starrett, L. S. Co., Athol, Mass.
- Machinists' Tools and Supplies**
 Billings & Spencer Co., Hartford, Conn.
 General Supply Co., 40 John St., N. Y.
 King, J. M. & Co., Waterford, N. Y.
- Manganese Bronze**
 Hungerford, U. T. Brass & Copper Co., 121 Worth St., N. Y.
- Manufacturing Properties**
 Hillman, J. H. & Co., Pittsburgh, Pa.
- Manufacturing Sites**
 Chicago, Milwaukee & St. Paul R. R., Chicago, Ill.
 Southern Railway Co., Washington, D. C.
- Measuring Machines**
 Rogers, Jno. M. Best, Gauge & Drill Wks., Gloucester City, N. J.
- Meat Choppers**
 Enterprise Mfg. Co. of Pa., Phila., Pa.
 Peck, Stow & Wilcox Co., 37 Murray St., New York.
 Streeter, N. R. & Co., Rochester, N. Y.
 Woodruff, O. D., Potstown, Pa.
- Metal Brokers**
 American Metal Co., 52 Broadway, N. Y.
- Metal Factors**
 Stroud, E. H. & Co., Chicago, Ill.
- Metals**
 Hendricks Bros., 49 Cliff St., N. Y.
 Hoteller, Theo. & Co., Buffalo, N. Y.
 Hungerford, U. T. Brass & Copper Co., 121 Worth St., N. Y.
 Rutter, A. T., 256 Broadway, N. Y.
 United Metals Selling Co., 11 Broadway, N. Y.
- Metal Polish**
 Hoffman, Geo. W., Indianapolis, Ind.
- Metal Spinning**
 Goodwin & Kintz Co., Winsted, Conn.
- Milling Machines**
 Adams Co., Dubuque, Iowa.
 Becker-Brainard Milling Machine Co., Hyde Park, Mass.
 Brown & Sharpe Mfg. Co., Providence,
- Carter & Hakes Mach. Co., Winsted, Ct.
 Cincinnati Milling Mach. Co., Cin., O.
 Fox Machine Co., Grand Rapids, Mich.
 Garvin Machine Co., Spring and Varick Sts., N. Y.
 Ingersoll Milling Mach. Co., Rockford, Ill.
 Lucas & Gillem, Philadelphia, Pa.
 Niles Tool Works, Hamilton, O.
 Shuster, F. H. Co., New Haven, Conn.
 Thurston Mfg. Co., Providence, R. I.
- Mining Knives**
 Bishop, Geo. H. & Co., Cincinnati, O.
 Palmer Hdw. Mfg. Co., Troy, N. Y.
- Mining Machinery**
 Allie, E. P. Co., Milwaukee, Wis.
 Rand Drill Co., 100 Broadway, N. Y.
- Mining Screens**
 Harrington & King Perforating Co., Chicago, Ill.
 Howard & Morse, 45 Fulton St., N. Y.
 Michigan Wire Cloth Co., Detroit, Mich.
- Miter Boxes**
 Thomson Bros. & Co., Lowell, Mass.
- Molding Machines**
 Adams Co., Dubuque, Iowa.
 Maywood Fdry. & Mch. Co., Chicago.
- Motor Fans**
 Hungerford, U. T. Brass & Copper Co., 121 Worth St., N. Y.
- Motors, Air**
 Stow Flexible Shaft Co., Phila., Pa.
- Motors, Petroleum**
 Daimler Mfg. Co., Long Island City, N. Y.
- Motors, Electric**
 Eddy Electric Mfg. Co., Windsor, Conn.
 General Electric Co., Schenectady, N. Y.
 Sturtevant, B. F. Co., Boston, Mass.
- Nail Clippers**
 Cook, H. C. Co., Ansonia, Conn.
- Nail Machinery**
 Crescent Mfg. Co., Bellville, Ill.
 Pittsburgh Mfg. Co., Pittsburgh, Pa.
- Nail Pullers**
 Bridgeport Mfg. Co., Bridgeport, Conn.
 Hagen & Reid, Troy, N. Y.
 Scranton & Co., The, New Haven, Conn.
 Snow L. T. New Haven, Conn.
- Name Plates, Machinery**
 Livermore, Homer F., Boston, Mass.
 Murdock Parlor Grate Co., Boston, Mass.
- Natural Gas Pumps**
 Norwalk Iron Wks. Co., So. Norwalk, Ct.
- Nickel Platers' Supplies**
 Eddy Electric Mfg. Co., Windsor, Conn.
- Nickeloid**
 American Nickeloid Co., Peru, Ill.
- Norway Shapes**
 Rowland, William & Harvey, Frankford, Philadelphia.
- Nuts—See Bolts**
- Nuts, Self-Locking**
 National Elastic Nut Co., Milwaukee, Wis.
- Nut Machines**
 Dunham Nut Co., Unionville, Conn.
- Oil Burning Appliances**
 Rockwell Engineering Co., 25 Cortlandt St., N. Y.
- Oil Extractor**
 Reed & Curtis Mch. Screw Co., Worcester, Mass.
- Oil Heaters—See Oil Stoves.**
- Oil Stones**
 Pike Mfg. Co., Pike Station, N. H.
- Oil Stoves—(See Stoves Oil, Vapor and Gasoline)**
- Oilers**
 Gem Mfg. Co., Pittsburgh, Pa.
 Hammer & Co., Branford, Conn.
 Stoughton Mfg. Co., Kelleysburg, Ill.
 Wilmot & Hobbs Mfg. Co., Bridgeport, Conn.
- Oilless Bearings**
 North American Metalline Co., Long Island City, N. Y.
- Ore Breakers**
 Aultman Co., Canton, O.
 Cresson, Geo. V. Co., Phila., Pa.
- Ore Shovels**
 Thew Automatic Shovel Co., Lorain, O.
- Ores**
 Blair, Reed F. Co., Pittsburgh, Pa.
 Samuel, Frank, Philadelphia, Pa.
 Wister, Francis, Philadelphia, Pa.
- Ox Shoes**
 Scranton Forging Co., Scranton, Pa.
 Woodruff, Walter W. & Sons, Mt. Carmel, Conn.
- Packing**
 Boston Belting Co., Boston, Mass.
 Morrison, Robert, St. Louis, Mo.
 Peerless Rubber Mfg. Co., 16 Warren Street, N. Y.
- Packing, Iron**
 Smooth On Mfg. Co., Jersey City, N. J.
- Paints**
 Dixon, Jos. Crucible Co., Jersey City.
- Pants Stretcher**
 Covert Mfg. Co., West Troy, N. Y.
- Patent Solicitors**
 Gospel & Haegeuer, 290 Broadway, N. Y.
 Hamlin, Geo. R., Washington, D. C.
 Howson & Howson, Philadelphia and Washington.
 Stocking, E. B., Washington, D. C.
- Perforated Metal**
 Clinton Wire Cloth Co., Clinton, Mass.
 Harrington & King Perforating Co., Chicago, Ill.
 Hungerford, U. T. Brass & Copper Co., 121 Worth St., N. Y.
- Phosphor Bronze**
 Hungerford, U. T. Brass & Copper Co., 121 Worth St., N. Y.
 Phosphor Bronze Smelting Co., Limited, Philadelphia.
- Phosphor Tin**
 Crescent Phosphorized Metal Co., Philadelphia, Pa.
 Halk & Naumann, 558 Pearl St., N. Y.
- Piano Plate Manufacturers**
 Randolph Iron Co., Brooklyn, N. Y.
- Picture Wire**
 Ossawatimille Co., Norwich, Conn.
- Pig Casting Machines**
 Heyl & Patterson, Pittsburgh, Pa.
- Pig Iron**
 Ashland Steel Co., Ashland, Ky.
 Baird, C. R. & Co., Phila., Pa.
 Cherry Valley Iron Co., Pittsburgh, Pa.
 Danville Bessemer Co., Danville, Pa.
 Dimmick, J. K. & Co., Phila., Pa.
 Hickman, Williams & Co., Chicago, Ill.
 Houston, C. B. & Co., Philadelphia, Pa.
 Nicoli, B. & Co., 39-41 Wall St., N. Y.
 Samuel, Frank, Philadelphia, Pa.
 Sloss-Sheffield Steel & Iron Co., Birmingham, Ala.
 Snyder, W. P. & Co., Pittsburgh, Pa.
 Superior Charcoal Iron Co., Grand Rapids, Mich.
 Tennessee Coal, Iron & R. R. Co., Birmingham, Ala.
 Tidewater Steel Co., Philada., Pa.
 Virginia Iron, Coal and Coke Co., Bristol, Va.—Tenn.
- Pig Iron Storage**
 Am. Pig Iron Storage Warrant Co., 4 Wall St., N. Y.
- Pig Lead**
 Penna. Smelting Co., Pittsburgh, Pa.
- Pile Drivers**
 Vulcan Iron Works, Chicago, Ill.
- Pipe, Bent**
 National Pipe Bending Co., New Haven, Conn.
 National Tube Co., Pittsburgh, Pa.
 Whitlock, Oil Pipe Co., Elmwood, Ct.
- Pipe Coupling**
 Williams, J. H. & Co., Brooklyn, N. Y.
- Pipe Cutting and Threading Machines**
 Armstrong Mfg. Co., Bridgeport, Conn.
 Bissell & Keeler Mfg. Co., Edwardsville, Ill.
 Curtis & Curtis, Bridgeport, Conn.
 Jarecki Mfg. Co., Erie, Pa.
 Merrill Mfg. Co., Toledo, O.
 Saunders' Sons, D., Yonkers, N. Y.
- Pipe Grips**
 Prentiss Vise Co., 44 Barclay, N. Y.
- Pipes, Fittings, &c.**
 Jarecki Mfg. Co., Erie, Pa.
 McNab & Harlin Mfg. Co., N. Y.
- Pipe, Riveted Steel**
 Pollock, W. B. Co., Youngstown, O.
 Scalfie, Wm. B. & Sons, Pittsburgh.
- Pipe Unions**
 Dart, E. M. Mfg. Co., Providence, R. I.
- Pipe, Water and Gas**
 Millar, C. & Son Co., Utica, N. Y.
 National Tube Co., Pittsburgh, Pa.
 Reading Fdry. Co., Reading, Pa.
 Red Jacket Mfg. Co., Davenport, Iowa.
 U. S. Cast Iron Pipe & Foundry Co., Phila., Pa.
 Warren City Boiler Works, Warren, O.
 Wood, R. D. & Co., Philadelphia, Pa.
- Piston Rods, Tobin Bronze**
 Ansonia Brass & Copper Co., 99 John St., N. Y.
- Planes**
 Stanley Rule & Level Co., N. Y.
- Planers**
 Amer. Tool Works Co., Cincinnati, O.
 Baird, U. Machinery Co., Pittsburgh, Pa.
 Bement, Miles & Co., Phila., Pa.
 Cincinnati Planer Co., Cincinnati, O.
 Detrick & Harvey Mch. Co., Baltimore.
 Draper Mch. Tool Co., Worcester, Mass.
 Niles Tool Works, Hamilton, Ohio.
 Whitcomb Mfg. Co., Worcester, Mass.
 Wilson, W. A., Rochester, N. Y.
- Plated Ware**
 International Silver Co., Meriden, Ct.
- Plates, Iron and Steel**
 Danville Bessemer Co., Danville, Pa.
 Jones & Laughlins, Ltd., Pittsburgh, Pa.
 Lukens Iron & Steel Co., Coatesville, Pa.
 Singer, Nimick & Co., Inc., Pittsburgh, Pa.
 Tidewater Steel Co., Philada., Pa.
 Wood, Alan Co., Philadelphia.
- Plate Iron Work**
 Scalfie, Wm. B. & Sons, Pittsburgh.
- Pliers**
 Bridgeport Mfg. Co., Bridgeport, Conn.
 Utica Drop Forge & Tool Co., Utica, N. Y.
- Pneumatic Tools**
 Chicago Pneumatic Tool Co., Chicago, Phila. Pneumatic Tool Co., Phila., Pa.
- Pocket Knives**
 Cattaraugus Cutlery Co., Little Valley, N. Y.
- Polishing Wheels**
 Divine Bros. Co., Utica, N. Y.
- Portable Track**
 Atlas Bolt & Screw Co., Cleveland, O.
- Poultry Nettings**
 Gilbert & Bennett Mfg. Co., 42 Cliff St., N. Y.
 N. J. Wire Cloth Co., Trenton, N. J.
 Trier, W. S. Co., Cleveland, N. Y.
 Wright & Colton Wire Cloth Co., Worcester, Mass.
- Power Hack Saws**
 Hoefler Mfg. Co., Freeport, Ill.
- Power Hammers**
 Beaudry & Co., Boston, Mass.
 Bradley Co., Syracuse, N. Y.
 Diener & Eisenhardt, Philadelphia.
 Dupont Mfg. Co., St. Johnsbury, Vt.
 Kidder, R. E., Worcester, Mass.
 Miner & Peck Mfg. Co., New Haven, Conn.
 Scranton & Co., The, New Haven, Conn.
- Power Transmitting Mach'y**
 Cresson, Geo. V. Co., Phila., Pa.
 Dodge Mfg. Co., Milwaukee, Ind.
 Machinery Supply Co., Rochester, N. Y.
 Norwalk Iron Wks. Co., So. Norwalk, Ct.
- Pressed Metal Work**
 Avery Stamping Co., Cleveland, Ohio.
- Presses, Power**
 Adirance Mach. Works, Brooklyn, N. Y.
- Bliss, E. W. Co., Brooklyn, N. Y.
 Cross & Speirs Mch. Co., Waterbury, Ct.
 Ferracute Mach. Co., Bridgeton, N. J.
 Hibbard, W. H., Brooklyn, N. Y.
 Hillies & Jones Co., Wilmington, Del.
 Keagy & Lear Mch. Co., Cohasset, O.
 Leffler, Chas. & Co., Brooklyn, N. Y.
 Manville, E. J. Mch. Co., Waterbury, Ct.
 Mossberg & Granville Mfg. Co., Providence, R. I.
 Niagara Machine & Tool Wks., Buffalo.
 Pershing Machine Co., Boston, Mass.
 Phila. Machine Tool Co., Phila., Pa.
 Rudolph & Krummel Chicago, Ill.
 Shuster, F. B. Co., New Haven, Conn.
- Projectiles**
 National Tube Co., Pittsburgh, Pa.
- Pruners**
 Henry, John T. Mfg. Co., Hamden, Ct.
- Pulleys**
 Amer. Pulley Co., Phila., Pa.
 Dodge Mfg. Co., Milwaukee, Ind.
 Eastern Machinery Co., New Haven, Ct.
 Evans, G. F., Boston, Mass.
 Jones & Laughlins, Ltd., Pittsburgh, Pa.
 Saginaw Mfg. Co., Saginaw, Mich.
 Woods, T. B. Sons, Chambersburg, Pa.
- Pumping Machinery**
 Cook, A. D., Lawrenceburg, Ind.
 Flier & Stowell Co., Milwaukee, Wis.
 Ingersoll-Sergeant Drill Co., 25 Cortlandt St., N. Y.
 McGowan, J. H. & Co., Cincinnati, O.
 Southwark Fdry. & Mch. Co., Philadelphia, Pa.
- Pumps**
 Athol Pump Co., Athol, Mass.
 Barnes Mfg. Co., Mansfield, O.
 Deming Co., Salem, O.
 Edson Mfg. Co., Boston, Mass.
 Flint & Walling Co., Kendallville, Ind.
 Hoss, Snyder & Co., Massillon, O.
 Humphreys Mfg. Co., Massillon, O.
 Myers, F. E. & Bro., Ashland, Ohio.
 Red Jacket Mfg. Co., Davenport, Ia.
 St. Joseph Pump & Mfg. Co., St. Joseph, Mo.
 Wilder, S. & Co., Holliston, Mass.
- Punches, Conductors'**
 Woodman, R. Mfg. & Supply Co., Boston, Mass.
- Punches and Shears, Hand and Power**
 Bethlehem Foundry & Machine Co., So. Bethlehem, Pa.
 Bicknell Hdw. Co., Jacksonville, Wis.
 Bliss, E. W. Co., Brooklyn, N. Y.
 Hillies & Jones Co., Wilmington, Del.
 Mersick C. S. & Co., New Haven, Conn.
 New Doty Mfg. Co., Janesville, Wis.
 Williams, White & Co., Moline, Ill.
- Punching and Shearing**
 Harrington & King Perforating Co., Chicago, Ill.
- Push Carts**
 Syracuse Chilled Plow Co., Syracuse.
- Pyrometers**
 Gehling, Steinbart & Co., Ltd., Carlstadt, N. J.
- Railways, Industrial**
 Hunt, C. W. Co., West New Brighton, N. Y.
- Rat and Mouse Traps**
 Burditt & Williams, Boston, Mass.
- Razors**
 Buck Bros., Millbury, Mass.
 Southington Cutlery Co., Southington, Conn.
- Razor Hones**
 Pike Mfg. Co., Pike Station, N. H.
- Reamers**
 Morse Twist Drill & Mch. Co., New Bedford, Mass.
- Recording Gauges**
 Bristol Co., Waterbury, Conn.
 Gehling, Steinbart & Co., Ltd., Carlstadt, N. J.
- Reels**
 Hendryx, A. B. Co., New Haven, Conn.
- Refrigerating Machinery**
 York Mfg. Co., York, Pa.
- Refrigerators**
 Maine Mfg. Co., Nashua, N. H.
 Wilke Mfg. Co., Richmond, Ind.
- Registers**
 Stowell Mfg. & Foundry Co., So. Milwaukee, Wis.
- Relaxing Rails**
 Donaldson & Newton, Phila., Pa.
 Isaac Joseph Iron Co., Cincinnati, O.
 May & Spalding, 32 Broadway, N. Y.
 Steel Rail Supply Co., 100 Broadway, N. Y.
- Reloading Tools**
 Bridgeport Gun Implement Co., 318-319 Broadway, N. Y.
 Hungerford, U. T. Brass & Copper Co., 121 Worth St., N. Y.
 Ideal Mfg. Co., New Haven, Conn.
- Repairing Sets, Family**
 Star Heel Plate Co., Newark, N. J.
- Repair Outfits, Farmers'**
 Imperial Bit & Snap Co., Racine, Wis.
- Revolution Counters**
 Pitkin, A. B. Machry. Co., Providence, R. I.
 Tabor Mfg. Co., Elizabeth, N. J.
- Revolvers**
 Harrington & Richardson Arms Co., Worcester, Mass.
 Johnson, Iver, Arms & Cycle Works, Fitchburg, Mass.
- Rheostats**
 Electric Controller & Supply Co., Cleveland, O.
- Rides**
 Marlin Fire Arms Co., New Haven, Ct.
 Remington Arms Co., 315 Broadway, N. Y.
 Stevens Arms & Tool Co., Chicopee Falls, Mass.
- Rins, Rollers**
 Shuster, F. B. Co., New Haven, Conn.
- Riveters**
 Phila. Pneumatic Tool Co., Phila., Pa.

Riveters, Pneumatic
Chicago Pneumatic Tool Co., Chicago, Ill.**Rivets**

American Iron & Steel Mfg. Co., Lebanon, Pa.
American Screw Co., Providence, R. I.
Blake & Johnson, Waterbury, Conn.
Burden Iron Co., Troy, N. Y.
Clark & Cowles, Plainville, Conn.
Cobb & Drew, Plymouth, Mass.
Grand Crossing Tack Co., Grand Crossing, Ill.
Hungerford, U. T., Brass & Copper Co., 121 Worth St., N. Y.
McInnes, C. E. & Co., Phila., Pa.
Plymouth Mills, Plymouth, Mass.
Rockford Bolt Works, Rockford, Ill.
Townsend C. C. & E. F., New Brighton, Pa.

Riveting Machines

Bethlehem Foundry & Mch. Co., So Bethlehem, Pa.
Shuster, F. B. Co., New Haven, Conn.

Roll Mill Machinery

Bradcock Machine & Mfg. Co., Brad-dock, Pa.
Morgan Construction Co., Worcester, Mass.

Roll Turning Tools

Irthwey, Sam'l & Co., Ltd., Pittsburgh

Roller Bearings

Ball Bearing Co., Boston, Mass.
Mossberg & Granville Mfg. Co., Providence, R. I.

Rollers

Whitehurst, R. W. & Co., Norfolk, Va.

Rolling Mill Machinery

Booth, the Lloyd Co., Youngstown, O.
Yenson, B. M., Pittsburgh, Pa.
Farrell Fdry. & Mch. Co., Ansonia, Ct.
Frank-Kneeland Mch. Co., Pittsburgh.
Garrison, A. Foundry Co., Pittsburgh.
Mesta Machine Co., Pittsburgh, Pa.
Morgan Construction Co., Worcester, Mass.
Mossberg & Granville Mfg. Co., Providence, R. I.
Penna. Engineering Wks., New Castle, Penna.
Totten & Hogg Iron & Steel Fdry. Co., Pittsburgh, Pa.

Rolls, Chilled, Sand and Steel

Booth, the Lloyd Co., Youngstown, O.
Farrell Fdry. & Mch. Co., Ansonia, Ct.
Frank-Kneeland Mch. Co., Pittsburgh.
Garrison, A. Foundry Co., Pittsburgh, Pa.
Lorain Foundry Co., Lorain, Ohio.
Mesta Machine Co., Pittsburgh, Pa.
Phila. Roll & Mch. Co., Philadelphia, Pa.
Seam, A. S., Pittsburgh.
Totten & Hogg Iron & Steel Fdry. Co., Pittsburgh, Pa.
Youngstown Foundry & Machine Co., Youngstown, O.

Roofing and Siding

Garry Iron & Steel Roofing Co., Cleveland, O.
Scaife, Wm. B. & Sons, Pittsburgh.
Youngstown Iron & Steel Roofing Co., Youngstown, O.

Rope and Cordage

American R. Co., 65 Wall St., N. Y.
Waterbury Rope Co., 69 South St., N. Y.

Rope and Web Goods

Covert Mfg. Co., West Troy, N. Y.

Rope Shield

Ironides Co., Columbus, Ohio.

Rope Transmission and Hoisting

American R. Co., 65 Wall St., N. Y.
California Wire Works, San Francisco, Cal.
Hunt, C. W. Co., West New Brighton, N. Y.
Leschen, A. & Sons, Rope Co., St. Louis, Mo.
Woods, T. B. Sons, Chambersburg, Pa.

Rubber Goods

Boston Belting Co., Boston, Mass.
Canfield, H. O., Bridgeport, Conn.
Peelless Rubber Mfg. Co., 16 Warren Street, N. Y.

Rules

Lufkin Rule Co., Saginaw, Mich.
Stanley Rule & Level Co., 29 Chambers St., N. Y.

Sad Irons

Williams, A. C., Ravenna, O.

Sad Iron Handles

Schrayers, M. Sons & Co., Chicago, Ill.

Sand Blast Apparatus

Ward, Edgar T. & Sons, Boston, Mass.

Sand Paper

Baeder, Adamson & Co., Phila., Pa.

Sapphires

Mejades Cutting Factories, 12-16 John St., N. Y.

Sash Balances

Caldwell Mfg. Co., Rochester, N. Y.
Fullman Sash Balance Co., Rochester, N. Y.

Sash Cords and Chains

Bridgeport Chain Co., Bridgeport, Conn.
Morton, Thos., 65 Elizabeth St., N. Y.
Samson Cordage Works, Boston, Mass.
Silver Lake Co., Boston, Mass.
Smith & Egge Mfg. Co., Bridgeport.

Sash Locks

Fitch, W. & E. T. Co., The New Haven, Conn.
Ives, H. B. & Co., New Haven, Conn.
Oelinger, J. L., Chicago, Ill.

Sash Pulleys

Fox Machine Co., Grand Rapids, Mich.
Grand Rapids Hardware Co., Grand Rapids, Mich.
Palmer Hardware Mfg. Co., Troy, N. Y.

Sash Weights

Barney & Reed Mfg. Co., Boston, Mass.
Brown, E. & Co., Philadelphia, Pa.

Sawage Stuffers

National Specialty Mfg. Co., Phila., Pa.

Saws

Atkins, E. C. & Co., Indianapolis, Ind.
Bishop, Geo. H. & Co., Cincinnati, Ohio.
Dixton, Henry & Sons, Inc., Phila., Pa.
National Saw Co., Newark, N. J.
Simonds Mfg. Co., Pittsburg, Mass.

Saw Guides

Thomson Bros. & Co., Lowell, Mass.

Saw Handles

Ladd, W. C., Bristol, Conn.

Saw Sets

Dixton, Henry & Sons, Inc., Phila., Pa.
Taintor Mfg. Co., 9 to 15 Murray, N. Y.

Saw Tools

Atkins, E. C. & Co., Indianapolis, Ind.
Chaffin, John & Sons, 85-89 Cliff, N. Y.
Chicago Seal Co., Chicago, Ill.
Pelouse Scale & Mfg. Co., Chicago, Ill.
Reading Hardware Co., Reading, Pa.
Standard Scale & Supply Co., Pittsburgh.

Scrap Metals

Armstrong, R. S. & Bro., Atlanta, Ga.
Blake, M. J. & M., 10th Ave. and 15th St., N. Y.
Boyer, C., Hoboken, N. J.
Greiner, P., Philadelphia, Pa.
Hitner, H. A. & Sons, Phila., Pa.
Hoffler, Theo. & Co., Buffalo, N. Y.
Leonard, John & Co., 22 Broadway, N. Y.
Miles, E. O. & Co., Atlan, Ga.
Brooklyn Metal Co., Paterson, N. J.
Perry, Wm. H. Co., Providence, R. I.
Phillips, F. R. & Sons Co., Phila., Pa.
Rogers, W. H., Bridgeport, Conn.
Samuels, M. Sons, Brooklyn, N. Y.
Smith Morton B. Co., New York.

Scrapers, Road

American Steel Scraper Co., Sidney, O.
Aultman Co., Canton, Ohio.
Kilbourne & Jacobs Mfg. Co., Columbus, Ohio.
Sidney Steel Scraper Co., Sidney, O.
Syracuse Chilled Plow Co., Syracuse, N. Y.

Screens, Perforated Metal

Harrington & King Perforating Co., Chicago, Ill.

Screens, Window and Door

Daroy, Edw. & Sons, Philadelphia, Pa.

Screw Cutting Dies

Card, S. W. Mfg. Co., Mansfield, Mass.
Geometric Drill Co., Westville, Conn.
Rogers, Jno. M., Boat Gauge & Drill Wks., Gloucester City, N. J.
Wells Bros. & Co., Greenfield, Mass.
Wiley & Russell Mfg. Co., Greenfield, Mass.
Winter Bros., Wrentham, Mass.

Screw Drivers

Brown, R. H. & Co., New Haven, Conn.
Goodell-Pratt Co., Greenfield, Mass.
Rogers, Bro. Mfg. Co., Philadelphia, Pa.
Sawyer Tool Co., Fitchburg, Mass.
Union Mfg. Co., Buffalo, N. Y.

Screw Machinery

American Tool Wks. Co., Cincinnati, O.
Baker Bros., Toledo, O.
Brooklyn Sharp Mfg. Co., Providence, R. I.
Draper Mach. Tool Co., Worcester, Mass.
Garvin Machine Co., Springfield and Varick Sts., N. Y.
Jones & Lamson Men. Co., Springfield, Vt.
Windsor Mch. Co., Windsor, Vt.

Screws

Hall's Sam'l Sons, 229 West 10th St., N. Y.
Haskell, Wm. H. Mfg. Co., Pawtucket, R. I.

Machine

American Screw Co., Providence, R. I.
Blake & Johnson, Waterbury, Conn.
Chicago Screw Co., Chicago, Ill.
Haskell, Wm. H. Mfg. Co., Pawtucket, R. I.
Hubbell, Harvey, Bridgeport, Conn.
Illinois Screw Co., Chicago, Ill.
Miles, F. S., 265 Quarry, Philadelphia, Pa.
Phila. Mach. Screw Works, Phila., Pa.
Pittsburgh Screw & Bolt Co., Pittsburgh, Pa.

Reed & Curtis Mch. Screw Co.

Reed & Curtis Mch. Screw Co., Worcester, Mass.
Rhode Island Tool Co., Providence, R. I.
Southington Cutlery Co., Southington, Conn.
Worcester Mch. Screw Co., Worcester, Mass.

American Screw Co.

American Screw Co., Providence, R. I.
Franklin Moore Co., Winsted, Conn.
Southington Cutlery Co., Southington, Conn.

Scroll Saws

Bacon, W. F. & John Co., Rockford, Ill.
Millers Falls Co., 24 Warren St., N. Y.
Seneca Falls Mfg. Co., Seneca Falls, N. Y.

Scythe Stones and Whetstones

Cleveland Stone Co., Cleveland, O.
Pike Mfg. Co., Pike Station, N. H.

Seamless Steel Tubes

Janney, Steinmetz & Co., Phila., Pa.
National Tube Co., Pittsburgh, Pa.

Sewing Machines

National Sewing Machine Co., Belvidere, Ill.

Shafting

American Steel & Wire Co., Chicago, Ill.
Cresson, Geo. V. Co., Philadelphia, Pa.
Dodge Mfg. Co., Mishawaka, Ind.
Fairmount Mch. Co., Philadelphia, Pa.
Finished Steel Co., Youngstown, O.
Jones & Laughlins Co., Pittsburgh, Pa.
Pittsburgh Steel Shafting Co., Rankin, Pa.

Shovel Mfg. Co.

Shovel Mfg. Co., Binghamton, N. Y.

Shaped Iron and Steel

Allentown Rolling Mill, Allentown, Pa.
American Steel Hoop Co., Pittsburgh, Pa.
Forest City Steel & Iron Co., Cleveland, Ohio.
Lindsay, W. W. & Co., Phila., Pa.
Lockhart Iron & Steel Co., Pittsburgh, Pa.

National Steel Co.

National Steel Co., Bridgeport, O.
Practical Rolling Mill Co., Paterson, N. J.
Phoenix Iron Co., Phila., Pa.
Pittsburgh Steel Shafting Co., Rankin, Pa.

Republic Iron & Steel Co.

Republic Iron & Steel Co., Chicago, Ill.
Roberts, A. & P. Co., Phila., Pa.

Barker-Charl Mach. Tool Co.

Barker-Charl Mach. Tool Co., Cincinnati, O.
Gould & Eberhardt, Newark, N. J.
Potter & Johnston Co., Pawtucket, R. I.

Shear Knives

Pittsburgh Shear, Knife & Machine Co., Pittsburgh, Pa.

Tretthwey, Sam'l & Co.

Tretthwey, Sam'l & Co., Ltd., Pittsburgh

Shears and Scissors

Acme Shear Co., Bridgeport, Conn.
Cataraugus Cutlery Co., Little Valley, Pa.

Helmsch's, R. Sons Co.

Helmsch's, R. Sons Co., Newark, N. J.
Lane Cutlery Works, Cedar Rapids, Ia.
National Cutlery Co., Phila., Pa.
Wiebusch & Hilger, Ltd., 9-15 Murray St., N. Y.

Shears, Metal

Carlin's, Thomas Sons Co., Allegheny, Pa.

Sheet Bars

National Steel Co., Battery Park Building, N. Y.

Sheet and Bolt Copper

Hungerford, U. T., Brass & Copper Co., 121 Worth St., N. Y.

Sheet and Rolled Brass

Hungerford, U. T., Brass & Copper Co., 121 Worth St., N. Y.

Sheet Metal Machinery

Adriance Mach. Works, Brooklyn, N. Y.

Sheets, Galvanized

American Sheet Steel Co., New York.
McCullough Iron Co., Wilmington, Del.

Sheets, Iron and Steel

American Sheet Steel Co., New York.
McCullough Iron Co., Wilmington, Del.
National Steel Co., Bridgeport, O.
Republic Iron & Steel Co., Chicago, Ill.
Singer, Nimick & Co., Inc., Pittsburgh, Pa.

Wister, L. & R. Co.

Wister, L. & R. Co., Philadelphia, Pa.
Alan Wood Co., Philadelphia.
W. Dewees Wood Co., McKeesport, Pa.

Sheet Zinc

Illinois Zinc Co., Peru, Ill.
Mathlessen & Hegeler Zinc Co., La Salle, Ill.

Shelf Boxes

Heller Box Co., Montclair, N. J.
Moore, C. P., Ravenswood, W. Va.

Shelf Ladders

Bicycle Step Ladder Co., Chicago, Ill.
Coburn Trolley Track Mfg. Co., Holyoke, Mass.

Milbradt, G. A. & Co.

Milbradt, G. A. & Co., St. Louis, Mo.
Morley Bros., Saginaw, Mich.
Portland Ladder Co., Newark, N. J.

Shelving

Warren, J. D. Mfg. Co., Chicago, Ill.

Shipbuilders

Newport News Shipbuilding & Dry Dock Co., 1 Broadway, N. Y.

Shovels, Spades and Scoops

New Castle Shovel Co., New Castle, Pa.
St. Louis Shovel Co., St. Louis, Mo.

Sinks

Kilbourne & Jacobs Mfg. Co., Columbus, Ohio.

Skates, Ice

Dame, Stoddard & Co., Boston, Mass.

Skate Sharpeners

Osborn Mfg. Co., Cleveland, O.

Skylights

Drouge, G. Co., Bridgeport, Conn.

Slaw Cutters

Dixton, Henry & Sons, Inc., Phila., Pa.

Smelting Works

Reeves, Paul S., 760 S. Broad, Phila.

Soapstone Goods

Pike Mfg. Co., Pike Station, N. H.

Soapstone Pencils

Steward, D. M. Mfg. Co., Chattanooga, Tenn.

Soldering Copper Handles

Hungerford, U. T., Brass & Copper Co., 121 Worth St., N. Y.

Soldering Coppers

Hungerford, U. T., Brass & Copper Co., 121 Worth St., N. Y.

Speaking Tubes

Strander, W. H. & Co., 304 Fulton St., N. Y.

Specialty Manufacturers

Franklin, H. H. Mfg. Co., Syracuse, N. Y.
Smith & Egge Mfg. Co., Bridgeport, Ct.

Spelter

Illinois Zinc Co., Peru, Ill.
Mathlessen & Hegeler Zinc Co., La Salle, Ill.
Penna. Smelting Co., Pittsburgh, Pa.

Spelter Solder

Hungerford, U. T., Brass & Copper Co., 121 Worth St., N. Y.

Spikes

American Iron & Steel Mfg. Co., Lebanon, Pa.

Spoons and Forks

International Silver Co., Meriden, Ct.

Sporting Goods

Dame, Stoddard & Co., Boston, Mass.

Spray Pumps—(See Pumps)**Springs**

American Steel & Wire Co., Chicago, Ill.
Barnes, Wallace Co., Bristol, Conn.
Cary Spring Works, 240 W. 29th St., N. Y.
Chaffin, John & Sons, 85-89 Cliff St., N. Y.

Clark & Cowles

Clark & Cowles, Plainville, Conn.
Dunbar Bros., Bristol, Conn.
Miller & Van Winkle, Brooklyn, N. Y.

Morgan Spring Co.

Morgan Spring Co., Worcester, Mass.
Sabin Machine Co., Montpelier, Vt.
Scott, Chas. Spring Co., Phila., Pa.
St. Johns Spring Co., St. Johns, Mich.
Welch, T. F. Mfg. Co., Boston, Mass.

Springs, Wagon, Etc.

Wurster, F. W. & Co., Brooklyn, N. Y.

Spring Cutters

Brooks, M. S. & Sons, Chester, Conn.
Holinger Fence Co., Greenville, O.

Spring Hinges

Bommer Bros., Brooklyn, N. Y.
Chicago Spring Butt Co., Chicago, Ill.
Coleman Hw. Co., Chicago, Ill.
Van Wagoner & Williams Hdw. Co., Cleveland, O.

Spruce Cutters, Foot and Power

Shuster, F. B. Co., New Haven, Conn.

Stacks

Scaife, Wm. B. & Sons, Pittsburgh.

Stamped Ware

Jenkinson, R. C. & Co., Newark, N. J.
Keen & Hagerty, Mfg. Co., Baltimore.
New York Stamping Co., Brooklyn, N. Y.

Stamping, Sheet Metal

American Hdw. Mfg. Co., Ottawa, Ill.
American Railway Supply Co., 34 Park Place, N. Y.
American Steel Scraper Co., Sidney, O.

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Clay Stamping Co., Cleveland, Ohio.
Cleveland Stamping & Tool Co., Cleveland, Ohio.

Davis & Buxton Stamping Co.

Davis & Buxton Stamping Co., Worcester, Mass.
Goodwin & Kints Co., Winsted, Conn.
Houghton & Buxton Mfg. Co., Worcester, Mass.

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Jenkinson, R. C. & Co., Newark, N. J.
Konklosow, E. & Bro., Cleveland, Ohio.
Mossberg, Frank Co., Attleboro, Mass.
Reed & Curtis Mch. Screw Co., Worcester, Mass.

Wheeling Hinge Co.

Wheeling Hinge Co., Wheeling, W. Va.

Staple Machines, Automatic

Shuster, F. B. Co., New Haven, Conn.

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Grand Crossing Tack Co., Grand Crossing, Ill.
Milwaukee Tack Co., Milwaukee, Wis.
Titchener, E. H. & Co., Binghamton, N. Y.

Steam Hammers, &c.

Dienelt & Eisenhardt, Philadelphia.
Dudgeon, Richard, 24 Columbia St., N. Y.
Sellers, Wm. & Co., Inc., Phila., Pa.

Steam Heating

Stocks and Dies

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 Card, S. W. Mfg. Co., Mansfield, Mass.
 Curtis & Curtis, Bridgeport, Conn.
 Fairbanks Co., 311 Broadway, N. Y.
 Hollands Mfg. Co., Erie, Pa.
 Jones & Lamson Mch. Co., Springfield, Vt.
 Jaracki Mfg. Co., Erie, Pa.
 Saunders' sons, D., Yonkers, N. Y.
 Wells Bros. & Co., Greenfield, Mass.
 Wiley & Russell Mfg. Co., Greenfield, Mass.
 Winter Bros., Wrentham, Mass.

Stone Cutting Machinery

Gilmour, J., Bennett Bld'g, N. Y.

Stone Working Machinery

Patch, F. H. Mfg. Co., Rutland, Vt.

Store Fixtures

Warren, J. M. Mfg. Co., Chicago, Ill.

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Stove Pipe Thimbles

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 Berlin Iron Bridge Co., E. Berlin, Conn.
 Boston Bridge Works, Boston, Mass.
 Eastern Bridge & Structural Co., Worcester, Mass.
 Forest City Steel & Iron Co., Cleveland, Ohio.
 Illinois Steel Co., Chicago, Ill.
 Mosley Iron Bridge & Roof Co., 39 Cortlandt St., N. Y.
 New England Structural Co., Boston, Mass.
 Ritter-Conley Mfg. Co., Pittsburgh, Pa.
 Shilfer Bridge Co., Pittsburgh, Pa.
 Stewart Iron Works, Cincinnati, Ohio.
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Grand Crossing Tack Co., Grand Crossing, Ill.

Milwaukee Tack Co., Milwaukee, Wis.

Plymouth Mills, Plymouth, Mass.

Ripley & Bartlett, Plymouth, Mass.

Shelton Co., Birmingham, Conn.

Tack and Nail Machinery

Kimball Bros. & Sprague, Brockton, Mass.

Perkins, Henry, Bridgewater, Mass.

Sweetzer, W. A., Brockton, Mass.

Tanks, Iron and Steel

Macogue-Pidgeon Iron Co., Memphis, Tenn.

Scaife, Wm. B. & Sons, Pittsburgh, Pa.

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Lufkin Rule Co., Saginaw, Mich.

Tap Holder

Ideal Machine Works, Hartford, Conn.

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Terne Plate

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Merchant & Co., Inc., Philadelphia, Pa.

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Keen & Hagerty, Baltimore, Md.

Tinware Machinery

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Tobin Bronze

Ansonia Brass & Copper Co., 99 John St., N. Y.

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Toe Clips

Snow, L. T., New Haven, Conn.

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